

Revised Total Coliform Rule Start-up Procedures for Seasonal Systems Handbook

*Colorado Department of Public Health and Environment
Water Quality Control Division
Colorado Safe Drinking Water Program*

This operational handbook has been developed to assist public water systems that are seasonal in complying with the applicable regulations in Regulation 11 of the Colorado Primary Drinking Water Regulations, 5 CCR 1002-11 (“Regulation 11”).



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**Department of Public
Health & Environment**

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1 INTRODUCTION

This handbook was prepared based upon the current requirements in the state statute and regulations. On March 10, 2015, the Water Quality Control Commission adopted revisions to Regulation 11 of the *Colorado Primary Drinking Water Regulations*, 5 CCR 1002-11 (“Regulation 11”). This included the addition of the Revised Total Coliform Rule in section 11.16 of Regulation 11. The purpose of this handbook is to provide a reference for public water systems that are seasonal and identifies:

- An overview of the Seasonal Systems portion of the Revised Total Coliform Rule
- Department policy regarding applicability to seasonally operated hand-pumped well systems
- Regulatory requirements
- Recommended best practices

2 OVERVIEW OF SEASONAL SYSTEM PORTION OF THE REVISED TOTAL COLIFORM RULE

The Revised Total Coliform Rule, provided in section 11.16 of Regulation 11, became effective April 1, 2016, and included:

- A definition for a seasonal system public water system.
- A NEW requirement that seasonal systems must complete department-approved start-up procedures each season.
- A NEW requirement that suppliers of water operating seasonal systems must certify that department-approved start-up procedures were completed.

3 DEPARTMENT POLICY

The department has developed this handbook for use by seasonal systems that do NOT utilize hand-pumped wells. If a system utilizes hand-pumped wells, the pertinent requirements are included in the document, “Monitoring and Operational Guidance for Colorado Public Water Systems Utilizing Hand-Pumped Wells Which Do Not Provide Continuous Disinfection.” This guidance is available online at: <https://www.colorado.gov/cdphe/wq-guidance>.

Regardless of whether the water system is de-pressurized, the supplier of water must follow the start-up procedures in Appendix B or submit alternative procedures to the department for approval.

4 REGULATORY REQUIREMENTS

This section identifies all of the regulatory requirements identified in Regulation 11 that are specific to or have special requirements for Seasonal Systems.

4.1 Drinking Water Monitoring

Upon seasonal start-up, suppliers of water are required to collect one total coliform sample within their distribution system and have it analyzed prior to serving water to the public. In addition, suppliers that operate seasonal systems are required to conduct routine drinking water quality monitoring. The department provides monitoring schedules that clearly identify all of the monitoring requirements. The monitoring schedules are updated weekly and available online at www.wqcdcompliance.com/schedules.

4.2 Start-up Procedures

Effective April 1, 2016, all suppliers of water that operate a seasonal system must complete department-approved start-up procedures prior to supplying water to the public each season. Appendix A provides department pre-approved start-up procedures for seasonal systems.

In addition, by the 10th of the month following the month that the seasonal system began supplying water to the public, the supplier must submit certification that the start-up procedures were completed. The certification can be found in Appendix B.

To comply with the requirement to complete start-up procedures, all suppliers of water operating seasonal system(s) have the following options:

Option 1: Use pre-approved start-up procedures (Appendix A).

Option 2: Submit start-up procedures for department approval (Appendix B).

The start-up procedures, sampling techniques, and record-keeping practices will be reviewed during the supplier's sanitary survey.

4.3 Sanitary Surveys

Routine sanitary surveys are required by Regulation 11 for all public water systems, including seasonal systems, every three to five years, depending on the system classification type:

- Community water systems every three years
- Non-transient non-community water systems every five years
- Transient non-community water systems every five years

The department has the authority to conduct more frequent sanitary surveys for any reason, including water quality concerns or to follow up on previous sanitary surveys. During a sanitary survey, the supplier's start-up procedures will be reviewed by the department inspector to ensure that they were completed before water was served to the public. If the supplier uses the department's pre-approved start-up procedures, the start-up log will be checked to verify completion of each step of the start-up procedures.

Please note that any unsafe condition within the water system can be identified by the department inspector as a significant deficiency during a sanitary survey. All significant deficiencies and Regulation 11 violations identified during a sanitary survey must be addressed and corrected.

5 RECOMMENDED BEST PRACTICES

Best practices discussed in this section are recommended but are not specifically required by Regulation 11.

5.1 Operational

The department recommends the following best practices for routine operations at seasonal systems:

- Prior to the supplier's scheduled opening date, perform start-up procedures and the required total coliform sampling in accordance with Appendix A with ample time to correct any sanitary defects that may be identified.
 - Failing to adequately complete start-up procedures that includes obtaining a sample free from total coliform and correcting any sanitary defects that may be identified during start-up, results in a violation of Regulation 11.
- Create a list of helpful contacts, such as the:
 - department's 24-hour Environmental Release/Incident Reporting line: (877) 518-5608
 - department's Total Coliform Positive Reporting line: (303) 692- 3308
 - staff and emergency contacts
 - local contractors

5.2 Disinfection

Develop a standard operating procedure for disinfecting your seasonal system. Starting with industry publications is appropriate, but having a customized procedure for the required disinfection practice will ensure consistent operation of your public water system.

6 OTHER HELPFUL RESOURCES

- AWWA Standard for Disinfecting Water Mains, ANSI/AWWA C651-14, American Water Works Association
- AWWA Standard for Disinfection of Water Storage Facilities, ANSI/AWWA C652-92 and C652-02, American Water Works Association
- AWWA Standard for Welded Steel Tanks for Water Storage, ANSI/AWWA D100-96, American Water Works Association
- AWWA Standard for Factory Coated Bolted Steel Tanks for Water Storage, ANSI/AWWA D103-97, American Water Works Association
- AWWA Standard for Disinfection of Wells, ANSI/AWWA C654-03, American Water Works Association
- Regulation 11 of the Colorado Primary Drinking Water Regulations, 5 CCR 1002-11, <https://www.colorado.gov/pacific/cdphe/water-quality-control-commission-regulations>

7 FREQUENTLY ASKED QUESTIONS

Q1: What if my water system is seasonal but I maintain pressure all year?

A: Regardless of whether the system is pressurized or de-pressurized during the off season, the supplier of water must follow the start-up procedures in Appendix A or submit alternative procedures to the department for approval.

Q2: How do seasonal populations and special events effect my population?

A: Seasonal populations are counted as part of the average daily population for existing public water systems as well as for when determining whether a new water system is public or not.

For special events, the number of people who have access to the water, per day, would be considered transients when determining your average daily population for existing public water systems as well as for when determining whether a new water system is public or not.

Q3: What if I start up mid-month?

A: You must provide certification in writing (department's portal, fax, US mail, etc.) to the department by the 10th day of the following month, notifying the department that you followed the approved start-up procedures prior to serving water to the public.

Appendix A: Start-up Procedures for Seasonal Systems

Start-up Procedures for Seasonal Systems

Using the start-up procedures listed below, as well as documenting the start-up activities on the corresponding *Seasonal Start-up Log* (attached to these procedures) constitutes use of a pre-approved procedure in accordance with Regulation 11, Section 11.16(5)(b).

The pre-approved start-up procedures are as follows:

1. Waterworks Inspection

- a. Look for any damage or evidence of contamination associated with any part of the waterworks that may have occurred during the offseason.
- b. For well sources, inspect the wellhead(s) and verify that the well casing is structurally sound, the well cap is tightly attached, vents are downturned with intact screens, and the electrical conduit is securely in place. Inspect the area surrounding the wellhead.
- c. For spring sources, inspect the spring box and area around the spring for any sources of contamination.
- d. Water treatment equipment must be assessed. Storage tanks must be checked for sanitary integrity by inspecting vents, overflows, and hatches. Do a walk-through of the water distribution and plumbing systems. Look at pipes, valves, and backflow prevention devices - ensure such devices have been appropriately tested and verify tags. Ensure that valves are exercised (turned off and on), operate correctly, and repaired/replaced as needed.

2. Integrity Check

- a. Leaks in the waterworks, especially in buried piping, provide potential conduits for contaminants to enter when the water system is drained or when system pressure is lost. To help gain a better understanding of leakage within the distribution system(s), conduct an integrity check once the system is re-pressurized as follows:
 - i. After filling the system with water and with all the taps turned off, switch off the power supply to the well pump. Read the water system's pressure gauge and write down the initial system pressure.
 - ii. After one hour, read the pressure gauge again and document the system pressure. Any pressure loss over this one hour time span indicates leaks. The pressure must remain within 10 or 15% of the original pressure.
 - iii. Some system leakage is to be expected; however, if pressure loss is greater than 15%, the leak must be found and repaired. Locating and repairing leaks is strongly recommended for all leaks.
 - iv. Ensure that repaired/replaced distribution system components are properly disinfected (see the next section below that addresses system disinfection) prior to serving water.
 - v. Having the ability to isolate and then retest portions of the water system (rather than the entire distribution system) can assist in locating leaks.

- vi. Comparing pressure loss data from year to year can provide insight into the relative degree of leakage within the distribution systems. If a functional pressure gauge is lacking, a distribution integrity check can be accomplished by documenting the number of well pump on/off cycles that occur over a one hour period when no water is being used - a cycling well pump indicates leaks. Well pump cycling may be masked when pressure tanks (i.e., hydropneumatic tanks) are included as part of the water system. Systems with pressure tank working volumes that exceed the volume of leaking water will not experience pump cycling and thus mask distribution system leakage. Water suppliers should isolate pressure tanks from the distribution system during leak tests.

3. System Disinfection and Flushing

- a. Disinfection of waterworks is a required step in the start-up procedure. Disinfection kills microorganisms that can be introduced during shut down or the offseason when the water system is depressurized. Most commonly, water system disinfection can be accomplished by introducing a chlorine/water disinfecting solution throughout the system and allowing adequate contact time before flushing. For seasonal systems that consist of buried water lines, the Department requires highly chlorinated water be used in accordance with American Waterworks Association (AWWA) published standards. Chlorine residual must be greater than 10 mg/L after each segment of the waterworks is isolated for at least 6 hours.
 - i. Certain water systems that consist solely of internal plumbing (e.g., do not require a distribution system operator) may choose to disinfect and flush the plumbing system with background (e.g. ~2.0 mg/L chlorine residual) chlorine levels and doses.
 - ii. After system disinfection, be sure that any highly concentrated chlorine is flushed from the system prior to collecting the sample to be analyzed. For proper disposal of chlorinated water, please refer to the Department's Clean Water Program low risk discharge policies:
<https://www.colorado.gov/pacific/cdphe/water-quality-permitting-policies>
- b. Once disinfection is completed, the water system must be operated and allowed to return to the typical level of background chlorine residual prior to serving customers. Per Regulation 11 and effective April 1, 2016, chlorine residual must be greater than or equal to 0.2 mg/L throughout the distribution system.

4. Entry Point and Distribution System Monitoring

- a. Prior to serving water to the public for a given season, Regulation 11 requires that suppliers of water collect a sample from within the distribution system and have it tested for total coliform. **The sample must test absent for the presence of coliform bacteria prior to the supplier serving water to the public for that season.** This process helps identify and allows correction of any water quality problems before opening and serving water to the public.
- b. During normal operations, total coliform samples must be collected in the distribution system every month and analyzed for chlorine residual and total coliform bacteria during the operating season.

- c. Also during normal operations, all required entry point sampling must be performed in accordance with the system's [monitoring schedule](#).
- d. An EPA approved chlorine test kit or EPA approved chlorine test strips must be used to assure there is appropriate chlorine residual in the distribution system.

5. Certification of Procedures Completed (Report)

- a. Complete and submit to the department the certification of start-up procedures (see Appendix B).

6. Start-up Log (see following page)

- a. An appropriate start-up log is part of the pre-approved start-up procedures and must be completed in order to verify completion of each step of the procedures. In the log, please note any sanitary deficiencies and confirm that they have been corrected.

SEASONAL SYSTEM START-UP LOG		SYSTEM NAME	
	DESCRIPTION	DATE COMPLETED	CORRECTIVE ACTIONS AND NOTES
Inspection - Correct any Sanitary defects	1. Wellhead (or Spring) cap or cover Must be secure, seals intact and have a screened vent.		
	2. Wellhead (or Spring) area Ensure at least 75 to 200 ft around the well is maintained clear of fuels, septic components, animal manure, fertilizers, etc.		
	3. Well house or Pump house (if applicable) Maintain proper sanitary and safety conditions, locked, no water leaks.		
	4. Treatment facilities Verify whether chlorination and any other required treatment is fully operational.		
	5. Storage Tank (if applicable) Check tank integrity, whether hatch is sealed and vent and overflow are screened.		
	6. Cross Connection Control assembly check - including dump stations (at camp grounds) Testable RPZ or sustained air gap must be in place.		
Integrity Check	7. Distribution piping, valves and service lines Reconnect all the plumbing and pressurize the system. Exercise valves and blow-offs, repair leaks.		
Disinfection and Flushing	8. Shock Disinfection Disinfecting the distribution system is required. The American Waterworks Association (AWWA) has published standards and guidance for disinfecting distribution systems. See link .		
	9. Flushing After disinfection, flush water until chlorine returns to normal operating levels.		
Monitor	10. Startup Bacteria sample and chlorine residual Collection of at least one pre-opening bacteria sample after flushing and prior to opening is required (Section 11.16(5)(c) of Regulation 11).		
	11. Sample Locations should be clean, labeled and accessible.		
Report	12. Start-up Certification Form (Appendix B) Submit completed and signed certification to the department once start-up procedures are completed.		
	13. Additional notes:		

Appendix B: Certification of Completion of Start-up Procedures

<https://www.colorado.gov/cdphe/gwr>