

GUIDANCE DOCUMENT

Presence of Total Coliform or Fecal Coliform/ *E. coli* Bacteria in the Water Supply At Food Service Establishments

Originally Prepared by:
Connecticut Department of Public Health
Connecticut Association of Directors of Health, Inc.
Connecticut Environmental Health Association

This document supersedes a similarly titled guidance document dated July 15, 2005.

Purpose: To provide procedural guidelines to be followed by local health departments when the water supply serving a food service establishment, under local health department jurisdiction, exceeds the monthly maximum contaminant level (MCL) for total coliform bacteria or Fecal Coliforms / *E. coli*. Compliance with the MCL is based on the results of the initial sample and repeat samples and is a presence/absence test, so that colony counts typically are not reported.

What are coliform bacteria?

Coliform bacteria are organisms that are present in the environment and in the feces of all warm-blooded animals and humans. Coliform bacteria will not likely cause illness. However, their presence in drinking water indicates that disease-causing organisms (pathogens) could be in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is relatively easy and inexpensive to test for coliform bacteria. If coliform bacteria are found in a water sample, water system operators work to find the source of contamination and restore safe drinking water. There are three different groups of coliform bacteria; each has a different level of risk.

Total coliform, fecal coliform, and *E. coli*:

Total coliform, fecal coliform, and *E. coli* are all indicators of drinking water quality. The total coliform group is a large collection of different kinds of bacteria. Fecal coliforms are types of total coliform that mostly exist in feces. *E. coli* is a sub-group of fecal coliform. When a water sample is sent to a lab, it is tested for total coliform. If total coliform is present, the sample will also be tested for either fecal coliform or *E. coli*, depending on the lab testing method. The occurrence of total coliform bacteria may be from a localized source such as a poorly maintained tap. Investigation of a total coliform incident may include additional sampling at the well itself, storage tanks and treatment system if applicable.

Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. If only total coliform bacteria are detected in drinking water, the source is probably from a non-pathogenic environmental origin (not likely sewage). Fecal contamination is not likely. However, if environmental contamination can enter the system, there may also be a way for pathogens to enter the system. Therefore, it is important to find the source and resolve the problem.

Fecal coliform bacteria are a sub-group of total coliform bacteria. They appear in great quantities in the intestines and feces of people and animals. The presence of fecal coliform in a drinking water sample often indicates recent fecal contamination, meaning that there is a greater risk that pathogens are present than if only total coliform bacteria is detected.

E. coli is a sub-group of the fecal coliform group. Most *E. coli* bacteria are harmless and are found in great quantities in the intestines of people and warm-blooded animals. Some strains, however, can cause illness. The presence of *E. coli* in a drinking water sample almost always indicates recent fecal contamination, meaning that there is a greater risk that pathogens are present.

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A note about *E. coli*: ***E. coli* outbreaks receive much media coverage. Most outbreaks have been caused by a specific strain of *E. coli* bacteria known as *E. coli* O157:H7. When a drinking water sample is reported as "*E. coli* present" it does not mean that this dangerous strain is present and, in fact, it is probably not present. However, it does indicate recent fecal contamination. Boiling or treating contaminated drinking water with a disinfectant destroys all forms of *E. coli*, including O157:H7.**

JURISDICTION AND RESPONSIBILITIES:

Possible Scenarios and Description of Parties Potentially Involved:

Potential actions by all parties are discussed in greater detail in a later section of this document. This section is intended to describe potential scenarios.

Food Service Establishment (FSE) is served by an on-site well and FSE owns the property: The food service establishment is considered to be a public water system, likely a Transient Non-Community Public Water System (unless the food service establishment employs more than 25 people in which case the classification would be Non-Transient Non-Community Public Water System). Responsibility for the public water system would fall to the owner, which in this case is the same party as the owner of the food service establishment. The FSE would interact directly with the local health department. The Department of Public Health Food Protection Program (DPH FPP) and Drinking Water Section (DPH DWS) are available to the local health department for technical assistance.

JURISDICTION, ROLES AND RESPONSIBILITIES: Under this scenario the party who owns the FSE, property and water system are the same entity. The entity is therefore under all jurisdictions and takes on applicable responsibilities.

Food Service Establishment is served by an on-site well but does not own the property: The property is considered to be a public water system. Classification of the public water system could vary. If the food service establishment is the only tenant, then classification would likely be a Transient Non-Community Public Water System (unless there are more than 25 employees). If the property has multiple tenants (eg. strip mall), then the classification would be based on total number of employees. A strip mall would be most likely classified as a Non-Transient Non-Community Public Water System (unless it is very small with fewer than 25 employees in total). The property owner also owns the public water system under this scenario and would be responsible to correct the water quality issue.

JURISDICTION, ROLES AND RESPONSIBILITIES: Under this scenario the party who owns the FSE is under the jurisdiction of the local health department and DPH FPP. The owner of the property and water system are the same entity. The owner of the property is therefore under the jurisdiction of DPH DWS.

Food Service Establishment is served by a community ("municipal", "city" or "town") public water system (ownership of the actual property is not likely relevant to this guidance document): Under this scenario, the DPH DWS is likely to be working directly with the community public water system to resolve the issue. The community public water system is responsible for resolving the water quality issue. The food service establishment(s) and the local health department (with assistance from DPH FPP) are working together directly with the food service establishment(s). All parties must maintain appropriate communication. Food service establishments and/or property are considered customers of the public water system.

JURISDICTION, ROLES AND RESPONSIBILITIES: Under this scenario the party who owns the FSE is under the jurisdiction of the local health department and DPH FPP. The owner of the property is considered a customer of the water system and is not under the direct jurisdiction of any agency as it pertains to drinking water. The water system entity is under the jurisdiction of DPH DWS.

An important point under this potential scenario is that if a large community public water system is involved, then the water quality issue could be affecting the operation of many (several hundreds or more) food service establishments. Refer to the last section of this guidance document for additional recommendations on large incidents.

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Maximum Contaminant Level (MCL) Violation: The MCL for total coliform bacteria is based on the presence or absence of total coliforms, rather than the coliform density. Compliance is based on the monthly MCL for total coliform bacteria. The US EPA sets drinking water standards and has determined that the presence of total coliform is a possible health concern. Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. If a MCL Violation is issued, coliforms were found in more samples than allowed and this is a warning of potential problems.

For systems analyzing at least 40 samples per month, no more than 5 percent of the monthly samples may be positive for total coliforms. For systems analyzing less than 40 samples, no more than one sample per month may be positive for total coliforms. Drinking water that meets this standard should be considered safe with respect to total coliforms.

If a public water system exceeds the MCL for total coliform bacteria, and E. coli bacteria or fecal coliform bacteria is also present in any of the samples collected, then this is an acute health risk violation of the MCL for total coliforms.

Reporting Positive E. Coli or Fecal Coliform Bacteria Test Results: If any routine or repeat water sample is *E. coli* positive or fecal coliform positive, the public water system shall notify the DPH DWS by the end of the day on which the system is notified of the positive test results but no later than ninety-six (96) hours from the time of sample in accordance with RCSA Section 19-13-B102(e)(7)(I). If the DPH is closed, the system shall notify the DPH DWS by the end of the next business day.

Reporting Total Coliform MCL Violations: Any public water system that has exceeded the MCL for total coliform bacteria shall report the violation to the DPH DWS and the local director of health (DOH) no later than the end of the next business day after it learns of the violation as required by RCSA Section 19-13-B102(h)(1).

Increased Monitoring Requirements for Coliform Bacteria: The monitoring frequency for total coliform bacteria shall be increased to five (5) routine samples per month beginning the month following the month in which the MCL violation occurred. Any reduction in this monitoring requirement for total coliform bacteria must be granted in writing by the DPH DWS. This is most likely to be applicable to food service establishments served by on-site wells.

Public Notification: A public water system that has exceeded the MCL for total coliform bacteria shall provide notification of the violation to its customers within 30 days after the violation occurs. Notification shall be by hand-delivery or by continuous posting in conspicuous places within the area served by the water system. Notification shall be in a manner prescribed by the DPH and shall comply with the specific language in the Code of Federal Regulations (40 CFR 141.32).

A public water system that has an acute risk violation of the MCL for total coliform bacteria (i.e. E. coli bacteria or fecal coliform bacteria also present) shall provide notification of the violation to its customers within twenty-four (24) hours after the violation occurs. Notification shall be by hand-delivery or by continuous posting in conspicuous places within the area served by the water system. Notification shall be in a manner prescribed by the DPH and shall comply with the specific language in the Code of Federal Regulations (40 CFR 141.32). Posting of the public notification form shall continue for as long as the violation exists.

Actions To Be Taken By The Local Director of Health For MCL Violations- Total Coliform MCL (no E.coli or Fecal Coliforms):

When the MCL violation that occurred is not acute, (eg. there is no *E.coli* or Fecal Coliforms) there is no action required by the DOH unless the DOH deems precautions or other actions are necessary. The presence of total coliform bacteria only does not present an immediate or substantial hazard to health. The current total coliform public notification template that is issued to all public water systems under this scenario does not require any additional precautions. The DPH DWS will issue the violation letter based on data received and track public notification requirements.

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In the event that the food service establishment is due for a routine food inspection by the local health department, this office suggests that the well and treatment system (if any) be assessed for regulatory compliance with RCSA Section 19-13-B51 and 19-13-B102. A review of the sanitary survey report issued by DPH DWS to public water systems and the local health department may be helpful in this assessment. The DPH DWS can be contacted in the event that the last report cannot be located. The DPH DWS can also review digital photographs taken by the local health department of the water system components to discuss current regulatory status of the public water system.

Another useful source of information for local health in determining whether testing requirements are being met for small public water systems including food service establishments is the “local health department” button on the DPH DWS website. Useful information on inventory of public water systems, compliance with monitoring and reporting requirements and MCL requirements, guidance documents and various relevant presentations can be found on the website at www.ct.gov/dph/publicdrinkingwater. The “Local Health Departments” tab is located in the left column.

Actions To Be Taken By the Local Director of Health For Acute MCL Violations - Total Coliform MCL (with presence of *E.coli* or Fecal Coliforms):

The actions to be taken by the local director of health in the event of acute violations are covered in more detail in the “Water Emergencies” portion of the DPH FPP website (www.ct.gov/dph/foodprotection). The DOH should order immediate closure until the FSE can substantiate that adequate interim alternate measures are in place. These actions may include:

1. Issuing 4-point demerit for failure to meet item #29 on the food service inspection form
2. Issuing orders which could include, but not be limited to, the following:
 - a. Corrective action to the well addressing deficiencies and violations noted in the last sanitary survey report if the food service establishment is served by an on-site well and owns the property
 - b. Appropriate interim measures (see DPH FPP website under “Water Emergencies”) to allow food service establishment to keep operating while the issue is resolved
 - c. Connecting to a nearby community public water system if this option is available - order could include physical disconnection of the existing contaminated wells from the system and recommend abandonment
 - d. Installation of appropriate treatment if the food service establishment is served by an on-site well and owns the property. (Note that treatment in this case must be approved by the DPH DWS)
 - e. Disinfection of the water system following any corrective work performed on the well or water system
 - f. Collection of follow-up samples to assess effectiveness of corrective actions
3. Keep the DPH DWS, DPH FPP and food service establishment informed while the situation is ongoing
4. Send DPH DWS a copy of any orders issued

Actions to be Taken by the Food Service Establishment (if owner occupied) or Owner of Water system (if food service establishment does not own water supply) for Acute MCL Violations - Total Coliform MCL (presence of *E.coli* or Fecal Coliforms):

The actions to be taken by the food service establishment in the event of acute violations are covered in more detail in the “Water Emergencies” portion of the DPH FPP website. Additional information is also available in the most recent DPH DWS sanitary survey report. These actions may include:

Food service establishment is owner-occupied (public water system with an on-site water supply)

1. Notify the local health department and DPH DWS of any MCL violations as required in the relevant section of RCSA Section 19-13-B102
2. Issue public notification (templates are provided by DPH DWS when violations are issued) as required under RCSA Section 19-13-B102
3. Abide by all interim directives and compliance measures implemented in consultation with the local health department and DPH FPP

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4. Address any violations of RCSA or significant deficiencies identified in the last sanitary survey report including follow-up disinfection
5. Keep the DPH DWS, DWS FPP and local health informed of any test results, corrective actions or other items of sanitary significance

Public water system owner (could be property owner for on-site water system or community public water system) responsibilities

1. Notify the local health department and DPH DWS of any MCL violations as required in the relevant section of RCSA Section 19-13-B102
2. Issue public notification (templates are provided by DPH DWS when violations are issued) as required under RCSA Section 19-13-B102
3. Address any violations of RCSA or significant deficiencies identified in the last sanitary survey report including follow up disinfection if applicable.
4. Keep the DPH DWS and local health informed of any test results, corrective actions or other items of sanitary significance

Food service establishment responsibilities when water supply is not owned

1. Abide by all interim protective measures implemented in consultation with the local health department and DPH FPP.
2. Allow access to food service establishment for any necessary sampling or evaluation of the drinking water supply.

Actions to be taken by the Connecticut Department of Public Health for Acute MCL Violations - Total Coliform MCL (with presence of *E.coli* or Fecal Coliforms):

DPH DWS

1. Issue an Incident Report Form on the violation summarizing the situation and the actions being taken. All interested parties are copied on the Incident Report Form.
2. Provide technical assistance to the public water system and local health department in an attempt to identify the source of the Fecal Coliforms / *E. coli* including a review of any sanitary deficiencies identified in previously conducted sanitary surveys, possible site visit, an explanation of common bacteria sources and requirements of the Groundwater Rule.
3. Provide public notice templates in a timely fashion (including having these available on the DPH DWS website)
4. Keep the local health department, DPH FPP and public water system informed including any additional sampling requirements
5. Conduct a priority review of any proposed corrective action or treatment installation as required under RCSA Section 19-13-B102(d)(2)
6. Issue a formal written violation (violation letter will provide information on the required actions that must be taken including, but not limited to, the public notification requirements, measures that must be taken to resolve the violation)
7. Pursue supplemental (to local health department) enforcement action as necessary
8. Copy all interested parties on any relevant reports that are issued.

DPH FPP

1. Provide technical assistance to the local health department in regards to appropriate interim protective measures.
2. Keep the local health department and DPH DWS informed of any technical guidance provided in regards to the food service operation.
3. Initiate outbreak investigation with appropriate parties if necessary.

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Communication between public water systems and local health departments:

DPH routinely encourages communication between community public water systems and local health departments. Communication becomes especially critical in the event of a water quality problem. It would be especially beneficial for public water systems and local health departments to work together on a way to quickly notify critical facilities such as food service establishments, medical centers etc. in the event of a water quality emergency so that necessary precautions can be instituted. DPH will always work to facilitate this communication and to implement standard procedures and resources (ie. Health Alert Network, incident reports etc.) to ensure it takes place in all scenarios, especially under emergency situations.

ADDITIONAL ATTACHMENTS:

There are two additional attachments related to this document. Attachment 1 provides additional information on the Groundwater Rule which became effective December 1, 2009. Attachment 2 deals with the installation of water treatment.

ATTACHMENT #1

The Groundwater Rule:

The Groundwater Rule became effective on December 1, 2009. One of the requirements of this rule is that raw water samples be collected in the event that the Total Coliform (both acute and non-acute) MCL is exceeded. The presence of fecal indicators would require that treatment capable of providing four-log inactivation or removal be provided. More information on the Groundwater Rule is available on the DPH DWS webpage. The major components of the Groundwater Rule are as follows:

1. Periodic sanitary surveys of ground water systems that require the evaluation of eight critical elements and the identification of significant deficiencies (e.g., a well located near a leaking septic system).
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions:
 - *Triggered monitoring* - Systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system must collect a raw water sample from each active source of supply within 24 hours.
 - *Assessment monitoring* - As a complement to triggered monitoring, a State has the option to require systems, at any time, to conduct source water assessment monitoring to help identify high risk systems.
3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following correction action options:
 - correct all significant deficiencies,
 - eliminate the source of contamination,
 - provide an alternate source of water, or
 - provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.
4. Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

ATTACHMENT #2

Water Treatment Systems:

Water treatment systems used for continuous disinfection of the public water system require the review and approval of the DPH DWS. Such treatment systems shall not be considered a substitute for the correction of violations of RCSA Section 19-13-B51. Continuous disinfection systems are considered to be a “last resort” after the water system has been brought up to RCSA standards, the water system has been disinfected, and bacteriological contamination is still present. When continuous disinfection systems are necessary, it is the responsibility of the owner of the public water system to submit plans and specifications to the DPH DWS for review and approval under RCSA Section 19-13-B102(d)(2) prior to any installation. The DPH DWS will complete a priority review of water treatment system plans and specifications.

Typical continuous disinfection systems that may be considered for approval include:

1. Ultraviolet light systems
2. Ozonation systems
3. Chlorination systems

Operational constraints of ultraviolet light due to certain levels of mineral in the raw well water may require the installation of additional treatment equipment. Minerals of concern include iron, manganese, and calcium/magnesium hardness. Chlorination and ozonation systems may also require additional water storage facilities to allow for the necessary contact time of water with the disinfectant. These indirect requirements have only become more stringent with the Groundwater Rule.

Water treatment components shall comply with National Sanitation Foundation (NSF) Standard 61 and water treatment chemicals shall comply with NSF Standard 60 or be approved by the Environmental Protection Agency (EPA) for drinking water treatment. The design of water treatment facilities shall comply with the DPH DWS’s guidelines, some of which are being updated to reflect the requirements of the Groundwater Rule.