Chapter 2: Water Quality

This chapter will help you understand and meet your obligation to monitor and report on the quality of water your system provides to your employees and customers. It will also guide you through short- and long-term steps to develop programs to protect your water supply source and your distribution system from potential sources of contamination.



**CHAPTER TOPICS**

This chapter addresses your:

* Water quality monitoring program
* Cross-connection control program
* Source water protection program

Each section offers a purpose statement, background on the requirement, and instructions. Most sections contain links to more information or resources.

2.1 Water Quality Monitoring Program

**Purpose**

To identify the type, frequency, and location of required water quality monitoring (sampling).

**Background**

Federal drinking water regulations set water quality standards for public water systems. State rule establishes:

* Maximum contaminant levels (WAC 246-290-310).
* Water quality monitoring requirements (WAC 246-290-300).
* Follow-up monitoring requirements (WAC 246-290-320).

Water quality monitoring requirements differ for TNC and NTNC systems. This is because TNC systems provide water to a population that changes day-to-day and NTNC systems serve the same people (such as employees or students) for most of the year.

The frequency of your required sampling depends on your system’s size, months of operation, and past sampling results. Be sure to keep a copy of all sampling results.

**TNC Water Systems**

**Your coliform and nitrate monitoring requirements are in your Water Facilities Inventory (WFI) Form.** Your water quality monitoring program can be as simple as a Coliform Monitoring Plan (CMP) that describes when and where to take coliform samples and the nitrate sampling schedule from your WFI form.

[**Preparing a Coliform Monitoring Plan for systems with one supply source**](http://www.doh.wa.gov/portals/1/Documents/pubs/331-240.pdf) **(331-240)** explains how to create a CMP for your noncommunity system.

**NTNC Water Systems**

NTNC systems **must** routinely sample for a host of potential contaminants in drinking water, including coliform, nitrate, lead and copper, disinfection by-products, inorganic chemicals, volatile organic chemicals, and synthetic organic chemicals. These samples are collected either at the source(s) or from the distribution system. If you add chlorine to disinfect your water supply, you also must sample and report chlorine residual results.

**Your distribution and source monitoring requirements for the calendar year and current three-year compliance period are in your Water Quality Monitoring Report (WQMR).** The WQMR identifies required sampling based on your system’s type, its source(s), and sampling history. If we grant a waiver for a source or change a monitoring requirement, we will notify you and update your WQMR for the next year.

**Refer to your WQMR to create a sampling schedule for your water quality monitoring program.** A water quality monitoring program helps you track the frequency and location of all your required sampling. If don’t have a water quality monitoring program, begin with a Coliform Monitoring Plan (CMP). Refer to your WQMR for the rest of your monitoring requirements.

[**Preparing a Coliform Monitoring Plan for systems with one supply source**](http://www.doh.wa.gov/portals/1/Documents/pubs/331-240.pdf) **(331-240)** explains how to create a CMP for your noncommunity system.

**How to complete this section**

Follow the steps below to complete Table 2-1. This section provides instructions and other resources to help you develop a Water Quality Monitoring Program.

**Step 1** **TNC systems:** Attach a copy of the coliform and nitrate sampling schedule from your WFI form in this section. If you have a CMP, attach a copy. If you don’t have a CMP, develop one now. See the link above.

**NTNC systems:** Attach a copy of your WQMR in this section. If you have a CMP, attach a copy. If you don’t have a CMP, develop one now. See the link above. For guidance on developing monitoring plans for additional contaminants, see the resources listed at the end of this section.

**Step 2** Attach any DOH correspondence on increased monitoring or follow-up monitoring requirements in this section to keep it current. If you treat to address chemical contamination (such as arsenic, nitrate, lead or copper corrosion) or microbiological contamination (surface water, shallow and vulnerable groundwater supplies, springs) special sampling and reporting requirements apply.

**Step 3** Transfer all estimated testing costs into your list of system expenses (Section 3.3)

**Step 4** Revise your testing schedule if additional follow-up testing is required, or you receive a waiver for a specific monitoring requirement.

Table 2-1
Water Quality Monitoring Program

|  |  |  |
| --- | --- | --- |
| **Completed** | **Task** | **Completion Date** |
| [ ]  | Step 1: TNC systems: Attach a copy of the coliform and nitrate sampling schedule from your WFI and a copy of your Coliform Monitoring Plan. **NTNC systems:** Attach a copy of your WQMR and a copy of your Coliform Monitoring Plan.  |  |
| **[ ]**  | **Step 2:** Attach any DOH correspondence on increased or follow-up monitoring requirements.  |  |
| **[ ]**  | **Step 3:** Transfer testing costs into your list of system expenses.  |  |
| [ ]  | **Step 4:** Revise testing schedule if monitoring requirements change.  | Ongoing |

**For more information**

# Our [Group A transient noncommunity water systems webpage](http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemAssistance/TNCWaterSystems.aspx) offers information and resources to help TNC water system owners understand and comply with drinking water requirements. NTNC owners may also benefit from this resource.

The following publications are on our website at <https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm>

* [***Coliform Distribution System Sampling Procedure***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-225.pdf) **(331-225)** explains how to collect a coliform sample. Also available in [Spanish](http://www.doh.wa.gov/portals/1/documents/pubs/331-225-S.pdf).
* [***Nitrate Sampling Procedure***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-222.pdf) **(331-222)** explains how to collect a nitrate sample. Also available in [Spanish](http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-222-s.pdf).
* [***Records Retention Reminder***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-431.pdf) **(331-431)** explains how long public water system owners must keep water system records.
* [***Coliform Information Packet***](http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Coliform/ColiformInformationPacket.aspx) **(331-258)** coliform is, how to test for it, and what to do if you find it in your water system.

Visit Department of Ecology for a list of [accredited drinking water labs](http://www.ecy.wa.gov/programs/eap/labs/search.html). <http://www.ecy.wa.gov/programs/eap/labs/search.html>

2.2 Cross-Connection Control Program

**Purpose**

To develop a Cross-Connection Control (CCC) Program to protect the water system from contamination.

**Background**

A cross connection is any actual or potential physical connection between a public water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow. Noncommunity water systems may be at greater risk from contamination due to cross connections than community (residential) systems because noncommunity systems often serve commercial or industrial users.

All noncommunity system owners must develop and implement a CCC program to protect the distribution system from contamination from cross connections (WAC 246-290-490). The 10 “elements” that comprise a CCC program are in WAC 246-290-490(3). The elements that apply to your system and the complexity of your CCC program depend on whether you own the buildings served and their degree of hazard.

|  |
| --- |
| **Cross-connection control responsibilities for noncommunity systems** |
| **Number of buildings or connections served** | **Elements of WAC 246-290-490 that apply** |
| My system serves only one building | You must implement a Cross-Connection Control Program that protects the public water system from contamination and keep associated records.The water system includes facilities under the control of the water system owner up to the point of delivery (buildings or facilities). Owners of public water systems that serve only one building typically own the building and the property it’s built on. Therefore, they have control over the plumbing and any external fixtures or auxiliary systems on the property. The Uniform Plumbing Code (UPC) amended for Washington State applies in these cases. The UPC amended for Washington establishes backflow prevention requirements for plumbing fixtures and equipment. It requires properly installed approved backflow preventers and annual assembly testing. If you have questions, contact your city or county building official. Information on the UPC Washington State amendments is online at <https://fortress.wa.gov/ga/apps/sbcc/page.aspx?nid=4> |
| My system serves multiple buildings or connections | You must implement the following cross-connection control requirements: **Element 4:** Obtain the services of a cross-connection control specialist (CCS) to develop and implement your CCC program. You can hire a contract CCS or have your certified operator (if you have one) become DOH-certified as a CCS rather than keeping a CCS on staff. **Element 1:** Establish the legal authority, policies, and corrective measures needed to carry out cross-connection control. If you own all buildings connected to the system, you don’t have to complete this element because you already have legal access into the premises.**Element 2:** Provide for a CCS to conduct initial and periodic hazard surveys to determine whether the connections it serves pose any risk to your water system. The CCS must also determine whether the premises isolation requirements apply (WAC 246-290-490(4)) or if you may rely on the state plumbing code to protect your system. **Element 3:** The CCS must ensure that DOH-approved backflow preventers are properly installed where required (WAC 246-290-490(4)). **Element 5:** Provide for a DOH-certified backflow assembly tester (BAT) to conduct annual testing of all backflow assemblies installed for premises isolation.**Element 7:** Develop procedures for responding to a backflow incident (such as notifying state and local health officials, flushing and sampling procedures, and public notice).**Element 9:** Maintain records of hazard surveys the CCS produces, and assembly inventory and testing information the BAT produces for backflow assemblies and backflow incident reports.You also must meet the requirements of the Uniform Plumbing Code (UPC) amended for Washington within buildings or facilities that you own. It establishes backflow prevention requirements for internal plumbing fixtures and equipment and external fixtures or auxiliary systems on the property. The UPC amended for Washington includes requirements for properly installed approved backflow preventers and annual assembly testing. If you have questions, contact your city or county building official. Information on the UPC Washington State amendments is online at <https://fortress.wa.gov/ga/apps/sbcc/page.aspx?nid=4> |

The cross-connection control regulations apply from your source of supply to the point of water delivery (connection) to the consumer’s premises (buildings or facilities). Table 9 in WAC 246-290-490 describes typical severe and high-hazard premises. Examples include wastewater treatment plants and lift stations, hospitals and medical centers, labs, car washes, commercial laundries, and mortuaries.

If your system serves any severe and high-hazard premises, you must control or eliminate the high hazard by ensuring that a DOH-approved reduced pressure principle backflow assembly (RPBA) or an air gap is installed at the point of service. The most **severe** hazard facilities require a RPBA and an in-premises air gap.

**How to complete this section**

Follow the instructions below to develop and implement a complete CCC program. Use Table 2-2 to track your progress and identify target completion dates for remaining steps.

The CCC program requires initial and ongoing tasks. You can separate the tasks into three steps.

1. **CCC program development**
	1. Retain qualified personnel.
	2. Establish legal authority (if you serve premises that you don’t own).
	3. Prepare a response plan for a backflow incident.
2. **CCC program initial implementation**
	1. Develop a recordkeeping and reporting system.
	2. Conduct initial hazard evaluations.
	3. Ensure assembly installation.
3. **CCC program ongoing implementation**
	1. Ensure assembly testing occurs and keep appropriate records.
	2. Evaluate new service connections and reevaluate existing service connections (if you serve premises that you don’t own)

Developing a CCC program can feel overwhelming. If you haven’t already developed and implemented a complete CCC program, begin by establishing the framework of a CCC program (Steps 1a through 1c below).

**CCC Program Development**

**Step 1a. Retain an experienced DOH-certified cross-connection control specialist (CCS)** to conduct initial hazard assessments. Depending on the results, your CCS can facilitate satisfying the required elements of WAC 246-290-490. If your system has a certified operator, find out whether he or she is a CCS. If you need to hire a contract CCS, see Section 7.1.1 in [***Cross-Connection Control for Small Water Systems***](http://www.doh.wa.gov/portals/1/documents/pubs/331-234.pdf) **(331-234).**

Check the DOH [cross-connection control and backflow prevention webpage](http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/CrossConnectionControlBackflowPrevention.aspx) for a public list of CCSs available to help small systems.

**Step 1b. Establish legal authority and policies necessary to implement an effective CCC program.** Your CCS must develop a CCC program plan that includes detailedtechnical and administrative policies and procedures (WAC 246-290-490(3)). Complete this step only if you serve facilities that you don’t own.

**Step 1c**. **Develop a response plan to a backflow incident.** Describe how you will respond to a backflow incident. Your response plan must include direction to call DOH, the local building official, and the local health department as soon as possible.

**CCC Program Initial Implementation**

**Step 2a. Develop a recordkeeping and reporting system.** Develop a CCC recordkeeping system to track:

* Hazard evaluation results (by connection).
* Inventory information for backflow preventers that protect your system.
* Test report information for backflow preventers that protect your system.

See a sample of a completed CCC program in Appendix A of [***Cross-Connection Control for Small Water Systems***](http://www.doh.wa.gov/portals/1/documents/pubs/331-234.pdf) **(331-234).**

If a backflow incident occurs, you must submit a completed [***Backflow Incident Report Form***](http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-457-F.pdf) **(331-457)** to DOH.

**Step 2b. Conduct initial premises hazard evaluations.** After you set up your recordkeeping system:

 Your CCS must:

* Evaluate each service connection to determine whether it is subject to the premises isolation requirement in WAC 246-290-490(4).
* Determine the type of protection needed, if any.

You must:

* Notify your customers of the results of the evaluations.

**Step 2c. Ensure assembly installation.** Ensure installation of DOH-approved backflow preventers on any premises requiring premises isolation.

**CCC Program Ongoing Implementation**

**Step 3a. Ensure assembly testing occurs and keep appropriate records.** You must ensure a DOH-certified BAT tests assemblies:

* Upon installation, repair, or relocation.
* Annually thereafter.
* After a backflow incident.

**Step 3b. Evaluate new and reevaluate existing connections.** If your system serves facilities that you don’t own, periodically reevaluate the connections (without RPBAs) for changes in water use or plumbing.

**Note:** Be sure to keep copies of all CCS hazards surveys and BAT test or inspection reports.

Table 2-2
Cross-Connection Control Program

Identify steps that you have completed and target completion dates for remaining tasks.

|  |  |  |
| --- | --- | --- |
| **Completed** | **Task** | **Completion Date** |
| [ ]  | **For systems that serve only one building:** Determine applicable state plumbing code requirements and ensure the level of cross-connection control within the premises is appropriate. |       |
| [ ]  | **Step 1a**: Retain the services of a CCS.  |       |
| [ ]  | **Step 1b:** Establish legal authority and policies (if needed) to implement a CCC program. |       |
| [ ]  | **Step 1c:** Develop a response plan to a backflow incident. |       |
| [ ]  | **Step 2a:** Develop a recordkeeping and reporting system. |       |
| [ ]  | **Step 2b:** Conduct initial hazard evaluations.  |       |
| [ ]  | **Step 2c:** Ensure assembly installation where required for premises isolation. |       |
| [ ]  | **Step 3a:** Ensure assembly testing and recordkeeping. |       |
| [ ]  | **Step 3b:** Evaluate connections. | Ongoing |

**Further action**

* Include required tasks not yet completed in Section 1.7 (Next Steps).

**For more information**

* See our cross-connection control webpage for guidance, backflow incident report and annual summary report forms, and other resources at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/CrossConnectionControlBackflowPrevention.aspx>

2.3 Source Water Protection Program

**Purpose**

To develop a Source Water Protection (SWP) Program to protect the groundwater sources supplying the system.

**Background**

The watershed or drainage basin surrounding your drinking water source is the source water protection area. All drinking water sources are at some risk of contamination and loss of supply if not carefully protected. Source water protection focuses on safeguarding and improving the quality and quantity of your system’s source of supply. Prevention is far less costly than responding to problems after they occur.

Source water protection requirements are in WAC 246-290-135. A successful SWP program is short, straightforward, and has a schedule for implementation. Still, developing a complete SWP program is a comprehensive process. As you progress beyond the first two steps, consider seeking help from your [DOH regional office](http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm) or a third-party technical assistance provider (see Page 3 of the guide).

If your system is supplied by surface water, contact your [DOH regional office](http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm) for help developing an appropriate SWP program.

**How to complete this section**

Follow the steps below to develop a SWP program. **Focus on Steps 1, 2, and 6 because they have the most immediate effect on the quality of your source of supply.** Use Table 2-3 to document your progress and set target completion dates for the remaining tasks.

**Note:** Some steps direct you to maintain copies of relevant documents in this section so that your SWSMP contains minimum SWP program information. You may also build your entire SWP program in your SWSMP.

**Step 1 Complete a susceptibility assessment form for each groundwater source and return it to your** [**DOH regional office**](http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm) **if you haven’t already done so.** This form (available from your regional office) helps determine how susceptible your well is to contamination. If you need help completing the form or cannot find your copy, contact your [DOH regional office](http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm).

* Maintain a completed susceptibility assessment form in this section.

**Step 2 Secure control of your sanitary control area.** You must maintain sanitary control around each groundwater source to protect it from contamination. The sanitary control area radius must be at least 100 feet for wells or 200 feet for springs, unless written documentation shows DOH reduced the distance. For guidance on sanitary control area protection, see [***Sanitary Control Area Protection***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-453.pdf) **(331-453).** For guidance on protective covenants, see [***Covenants for public water supply protection***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-048.pdf) **(331-048).**

* Maintain a copy of deeds, declarative or restrictive covenants, or written agreements in this section.
* Maintain a map that shows all sources and sanitary control areas in this section.

**Step 3 Define your source water protection area and create a map.** Many water systems have defined source water protection areas in our [Source Water Assessment Program database](https://fortress.wa.gov/doh/eh/dw/swap/maps/). Visit the site, turn on the appropriate layers, check for accuracy, and print the map. If your source protection zones (time-of-travel zones) are not shown, you can define them yourself using the calculated fixed radius (CFR) method. Start with the 6-month and 1-year time-of-travel zones. For help, see our [***Wellhead Protection Program Guidance Document***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-018.pdf) **(331-018).**

* Maintain a copy of your source water protection area in this section.

**Step 4 Conduct contaminant source inventory.** Survey your source protection area for activities that may pose a contamination threat to your source(s). You can do this by driving or walking around the area and noting land uses that may pose a threat of contamination. For examples of what to look for, see Page 85 of our [***Wellhead Protection Program Guidance Document***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-018.pdf) **(331-018).**

* Maintain a copy of your list of potential contaminants (inventory) in this section.

**Step 5 Notify local governments, landowners, and facility operators.** Local agencies make decisions about where to allow certain land uses, activities, or facilities. Owners and facility operators of possible contaminant sources might alter their practices if they know the location of your source water protection area.

* Write letters to owners and operators of possible contaminant sources to let them know of your source water protection area and to encourage them to protect your drinking water supply. See sample letters in our [***Wellhead Protection Program Guidance Document***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-018.pdf) **(331-018).** Focus on the 6-month and 1-year time of travel zones first.
* Write letters to local governments with authority over land use decisions and local emergency responders to inform them that activities they regulate occur within your source water protection area. Sample letters and agency contact information are in our [***Wellhead Protection Program Guidance Document***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-018.pdf) **(331-018).**
* Maintain copies of notification letters in this section.

**Step 6 Develop a contingency plan.** You should know what you’ll do in the short-term if you are unable to use your source(s) for any reason. How you handle such an event will depend on your business needs and those of the population your system serves. Develop your contingency plan as part of your emergency response plan (Section 3.2). For guidance, see our [***Emergency Response Planning Guide for Public Drinking Water Systems***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-211.pdf) **(331-211).**

Table 2-3
Source Water Protection Program

Identify the steps you have completed and set target completion dates for remaining tasks.

| **Completed** | **Task** | **Completion Date** |
| --- | --- | --- |
| [ ]  | **Step 1:** Complete a susceptibility assessment form for each source and submit to DOH. |       |
| [ ]  | **Step 2:** Secure control of your sanitary control area through legal documents and create a map showing each source and its sanitary control area.  |       |
| [ ]  | **Step 3:** Define your source water protection area and create a map showing the boundaries.  |       |
| [ ]  | **Step 4:** Survey your source water protection area to identify contaminant sources and develop a contaminant inventory list.  |       |
| [ ]  | **Step 5:** Notify local governments with land use decision authority, owners of possible contaminant sources, and local emergency responders of your source water protection area.  |       |
| [ ]  | **Step 6:** Develop a source water contingency plan as part of your emergency response plan. |       |
| [ ]  | **Continuous:** Update your inventory of contaminants every two years and resend notification letters as needed. | Ongoing |

**For more information**

* See the [***Wellhead Protection Program Guidance Document***](http://www.doh.wa.gov/portals/1/Documents/pubs/331-018.pdf) **(331-018).**
* See our [**SWAP database**](https://fortress.wa.gov/doh/eh/dw/swap/maps/) for information about potential contaminant sources in your area.
* See our [**Source Water Protection**](http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWater/SourceWaterProtection.aspx)website for links to other information.