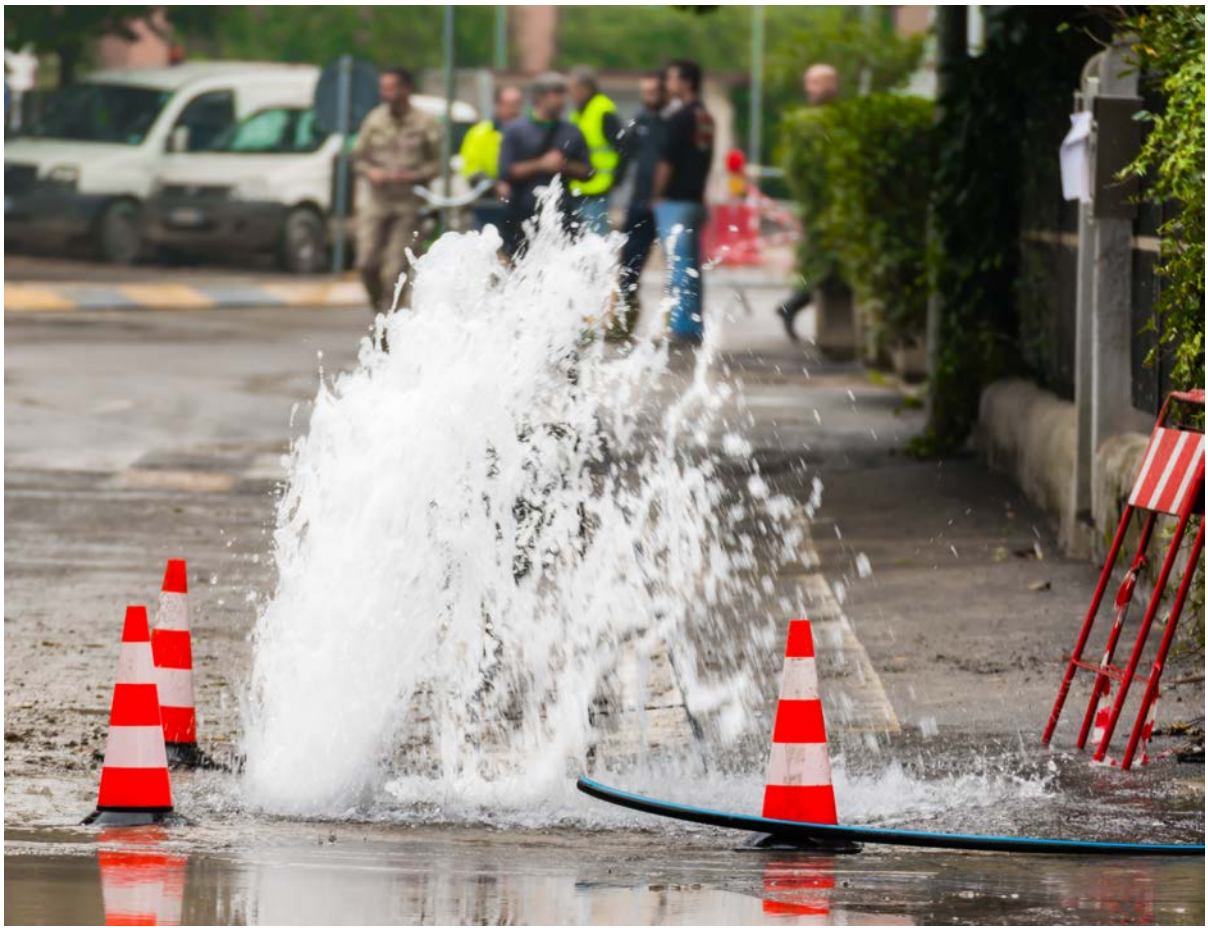
Emergency Response Planning Guide for Public Drinking Water Systems



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Part 1: Guidance and Instructions

Introduction: Protecting public health

Safe and reliable drinking water is important to every community. Emergency response planning is an essential part of managing your water system.

Most public water systems experience routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages. These routine operating emergencies are manageable if you have emergency response plans you can quickly put into action.

More serious, unanticipated emergencies may follow acts of sabotage, chemical spills, floods, earthquakes, windstorms, or droughts. These emergencies can drastically affect your system and community.

Each emergency has unique effects on different parts of a water system. Floods can cause widespread bacterial contamination, earthquakes can damage sources and distribution systems, and storms can disrupt power supplies for an extended period. The common element is that each emergency may threaten your ability to deliver safe and reliable drinking water.

Emergency response planning is a process that helps water system managers and staff explore vulnerabilities, make improvements, and establish procedures to follow during an emergency. It also encourages people to form partnerships and get to know one another. Preparing and practicing a response plan can save lives, prevent illness, enhance system security, minimize property damage, and lessen liability.

WAWARN: A free resource that could be priceless during an emergency
The Water/Wastewater Agency Response Network (WAWARN) allows water and wastewater systems to receive rapid mutual aid and assistance from other systems during an emergency. Utilities sign the WARN standard agreement, which allows them to share resources with other Washington systems that signed the agreement. For more information, visit the WARN website at http://www.wawarn.org/

Water systems must have an emergency response plan

Public water systems in Washington must have an emergency response plan as part of a water system plan or small water system management program (Chapter 246-290-415 (2)(b) WAC). This section of the drinking water rule also requires systems to employ reasonable security measures to protect raw water intake facilities, water treatment processes, storage facilities, pump houses, and distribution systems from possible damage or intruders.

This guidance document will help you develop the required emergency response program. You can also use other formats to meet emergency response program requirements.

How to use this document

Developing an emergency response plan can take a lot of time and effort. This document will make the job easier by guiding you to create a plan that works for your water system. Any water system can use this document and you can modify it to fit your specific needs. Larger water systems should use it as a starting point, because the complexity of larger systems requires more detail. Smaller water systems should consider each section and use what is relevant for the type, size, and complexity of their system.

This document has two parts with identical structure.

- **Part 1** discusses important emergency response planning elements and provides instructions and examples to help complete Part 2.
- **Part 2** is a template for creating your own plan. You can also use Part 1 as an educational tool to help system staff understand the key components of a well thought-out plan.

This document is online at http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-211.pdf

You can use Part 2 in its original form or modify it to meet your needs. The completed Part 2 may contain sensitive information, so be sure to store it in a safe and secure location. We recommend you maintain one copy on-site and one copy off-site, so it's available to you if you can't access your office or facilities. Documents you submit to us become public records. Therefore, if you submit your emergency response plan as part of a Water System Plan or Small Water System Management Program, you may choose to withhold parts of it.

Section 1.
Emergency response mission and goals

Stating a mission and goals for emergency response is an important first step because it helps you focus on the important aspects of the plan. The mission statement and goals should reflect your system's obligation to protect the health and safety of your customers, staff, and assets—and be able to maintain or restore safe and reliable drinking water. Developing partnerships with key response agencies should be in your goals.

Your system personnel should begin by understanding what they need to accomplish during an emergency. Protecting your customers' health is paramount. If the water is contaminated, you must notify customers quickly.

Example: Emergency response mission and goals

Mission statement for emergency response	In an emergency, the mission of the XYZ water system is to protect the health of our customers by being prepared to respond immediately to a variety of events that may contaminate the water or disrupt our water supply.
Goal 1	Be able to identify an emergency quickly and initiate timely and effective response action.
Goal 2	Be able to notify local, state, and federal agencies quickly so they can assist in the response, if necessary.
Goal 3	Protect public health by quickly being able to determine whether the water is unsafe to drink or use, notify customers of the situation immediately and effectively, and advise them of appropriate protective action.
Goal 4	Quickly respond and repair damages to minimize system down time.

The mission and goals are always the same, but your response procedures should be flexible because every emergency is different and may require a specific sequence of response actions to protect lives and minimize damages to your water system.

In any emergency, a water system should always follow these four steps:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate action to save lives, reduce injuries, and prevent system damage.
3. Make repairs based on service area priority.
4. Return the system to normal operation.

Section 2.
System Information

In any emergency, a water system needs to have basic information available for system personnel and external parties, such as emergency responders, contractors, media, and others. The information must be current, clear, and readily accessible. System staff must be able to find it quickly and provide it to those who may respond to the emergency. Providing this information in advance is an important step in forming partnerships.

Basic information for the emergency response plan are the system's ID number, system name, system address or location, directions to the system, population served, number of service connections, system owner, and information about the person in charge of managing the emergency. See example below.

Example: System information

System ID number	19900	
System name and address	XYZ Water System 1000 Anywhere Street XYZ, WA 98000	
Directions to the system	Go North on Route 6 to Exit 88. Take a right and head west for 2.9 mile to XYZ drive. Take a left onto XYZ drive and go .5 miles. Office is on the left. Pump house and treatment facilities are .2 miles past office on the right.	
Basic description and location of system facilities	XYZ water system has two groundwater wells of 180' and 223' depth and one surface water source with treatment. The wells pump through the pump house and chlorination treatment facilities into two storage reservoirs, one at the north end and one at the south end of the system, which feed the distribution system. The north reservoir is at the end of J Street and the south reservoir is at the intersection of Olive Street and 2nd Street.	
Location or Town	123 Taylor Ave., Anytown, Wash.	
Population served and number of service connections	650 people	225 connections
Name of system owner or person with primary responsibility	Todd Owner, Owner of XYZ Water System	
Name, title, and contact information of person responsible for implementing the emergency plan (if different from system owner). ***Update this contact information every year.***	Marsha Ready Manager	(360) 232-2323 Phone (360) 790-2323 Cell _____ Other

The table is a starting point. Your system may have unique circumstances or extend over a large geographical area that requires additional information. In any case, make sure the information is current, clear, and easily located.

Consider including a detailed map of the distribution system and a plan for communicating if phones and radios don't work. For example, arrange a place to meet and designate less technical ways to share and distribute information.

Section 3.
Chain of Command and Lines of Authority

When an emergency occurs, there can be confusion, lack of coordination, and poor communication. Timely and effective response can minimize the effects of an emergency. Often, the initial response sets the tone for the entire emergency.

Having a chain of command that defines clear lines of authority and responsibilities for system personnel during an emergency speeds up response time and helps eliminate confusion. System personnel need to know:

- Who to report an emergency to.
- Who will make decisions during the emergency.
- Their own responsibilities.

The first step in any emergency is to notify the person at the top of the chain of command—the person responsible for managing the emergency and making key decisions. This lead person will assess the situation and initiate a series of response actions based on the type and severity of emergency. Larger systems may have many people involved in the chain of command while small systems only have one or two. Very small systems may have only one person, usually the water system operator. Be sure to define all responsibilities clearly, so everyone knows their role before and during an emergency.

In addition to an individual having lead responsibility, your plan should assign the following key responsibilities to system personnel:

- Handle incoming phone calls and provide administrative support.
- Provide information to the public and media.
- Contact your customers.
- Assess your system's facilities and operations in the field.
- Organize and carry out repairs.

Example: Chain of command and lines of authority

Name and title	Responsibilities during an emergency	Contact numbers
Marsha Ready Water System Manager	Responsible for overall water system management and decision-making. • Manages the emergency • Provides information to regulatory agencies, the public, and news media • Approves all communications to external parties	Phone: 360-232-2323 Cell: 360-790-2323 Pager: 360-799-8999
John J. Dunbar Water System Operator	In charge of operating the water system • Performs inspections, maintenance and sampling • Relays critical information • Assesses facilities • Provides recommendations to the water system manager	
Freddy Filter Water Treatment Plant Operator	In charge of running the water treatment plant • Performs inspections, maintenance and sampling • Relays critical information • Assesses facilities • Provides recommendations to the water system operator or manager	
Mary Marshall Office Administrator	Responsible for administrative functions in the office • Receives phone calls and keeps a log of events • Provides a standard, carefully pre-scripted message to those who call with general questions (The water system manager decides if and when to release additional information)	
Jerry Mander Field Staff	Delivers door hangers and supports the water system operator	

Section 4.
Events that Cause Emergencies

Emergencies happen for many reasons, including:

- Natural disasters
- Accidents
- Deliberate vandalism or terrorism
- System neglect or deferred maintenance

An emergency may affect isolated sections or your entire water system. You should evaluate a variety of events and the damage they may cause to your water system and its infrastructure. Each type of event can cause different damage to system components or contamination resulting in a service disruption. You should reflect these evaluations in your water system's vulnerability assessment and procedures for responding to specific events discussed later in this document.

Natural Disasters

Consider common natural disasters when developing an emergency response plan:

Earthquakes: Damage results as the earth shifts along geologic faults. Shaking and ground settling can cause severe structural damage to virtually all water system facilities, including sources, transmission and distribution lines, storage reservoirs, and pump houses. Although not severe, the Nisqually Earthquake caused problems for water systems in Western Washington. It broke distribution pipes and service lines, shifted storage reservoirs, and damaged buildings. Although no major outages were reported, it was a serious reminder that these things can and do happen.

Emergency response plans should evaluate what facilities are at risk during an earthquake, what can be done to minimize damage (for example, strapping down reservoirs), and actions the system can take to respond to such an event. It is also important to have backup communication plans, because radios and cell phones may not work after an earthquake.

Floods: Floods are a common event in the Pacific Northwest. They can cause widespread contamination as turbid waters carry bacteria that can overflow sources, transmission lines, treatment facilities, and pumping facilities. Floods can also ruin electrical components and telemetry systems.

It is important for a water system to assess its vulnerability to flooding. Consider damage to roads and bridges where distribution or transmission lines are located. Washout of roads or bridges not only damage pipes but can also interfere with repair. If the risk for a flood is high, the water system should plan for and consider mitigating actions to protect facilities and equipment.

Also, consider identifying alternative transportation routes to get in and out of the area.

High winds: Pacific Northwest storms often generate winds in excess of 50 miles an hour and have exceeded hurricane-force sustained winds of 74 miles an hour or greater from time-to-time. These storms often disrupt power and damage water system facilities.

Ice Storms: There are occasional ice storms in the Pacific Northwest. These storms can cause major power outages, and freeze water pipes. Ice can make it difficult for crews to get to areas that need repairs.

Wildfires: Wildfires are a recurring issue throughout eastern and north central Washington. They can cause widespread power outages and damage water system facilities in addition to the devastating loss of homes (see sidebar previous page). Tackling wildfires may strain local water supplies. That alone is reason to prepare in advance!

Waterborne diseases: Organisms such as *Giardia* and *Cryptosporidium* can contaminate water supplies and cause waterborne diseases. In 1993, a *Cryptosporidium* outbreak in Milwaukee, Wisconsin, killed more than 100 people and sickened more than 400,000. An *E. coli* outbreak in Walkerton, Ontario, killed seven people and sickened over 2,300 (see sidebar next page). Both cases illustrate that proper operations, management, and planning are truly a matter of life-or-death.

Human-caused events

Human-caused events that can result in a water system emergency include chemical spills, vandalism, terrorism, cyber-attack, fires, construction accidents, and basic neglect of maintaining the system.

Vandalism: Most vandalism is spontaneous rather than preplanned or premeditated. Using materials at hand, vandals often break into systems, damage facilities, and paint graffiti. You can prevent these acts by enhancing security, increasing lighting, installing locks on doors and hatches, and putting up security fencing.

Terrorism: Terrorism is a very real threat in America. Even though it may seem unlikely, it would only take one well-staged event to undermine drinking water safety. Being prepared and knowing what to look for are crucial elements of preventing an attack on the system.

There are many potential terror threats to drinking water systems, including chemical, biological or radiological contamination and damage to infrastructure and computer systems. In most cases, contamination using biological or chemical agents would cause the most concern for a drinking water system. Although it would be difficult to effectively contaminate a large water supply with these agents or cause major damage, you must not take the possibility lightly. The threat is real. Drinking water systems need to enhance security around facilities and be prepared to respond.

System neglect: System neglect, often called "deferred maintenance," is a major cause of emergencies. System components that go too long without attention can fail, causing an emergency. Water systems need to evaluate facilities continuously and replace them before a massive failure occurs. In one case, a water system continuously put off repairing a major transmission line that traversed a hillside in town. The line finally failed and caused an immense slide, destroying a number of homes and causing significant damage.

Cross Connections: A cross connection is an actual or potential physical connection between a public water system and any source of nonpotable liquid, solid, or gas that could contaminate the water supply through a backflow process. Cross connections usually occur when someone unknowingly makes a connection in the system. Backflow occurs when water or other substances flows in reverse back into the public water system. Under backflow conditions, unprotected cross connections can provide a path for biological, chemical, or physical contaminants to enter the water supply. These contaminants can lead to waterborne disease outbreaks, chemical poisonings, and sometimes death. Backflow usually occurs when pressure loss somewhere in the system causes water flow to reverse.

Waterborne Illness in Walkerton, Ontario (2000)

What happened: A storm washed bacteria-laden cow manure into a poorly planned and poorly maintained well. Water pumped to taps throughout the town of Walkerton. Operational problems included inconsistent water treatment, falsification of water quality tests, mislabeling samples, and failure to notify public health officials in order to avoid regulators.

Results: Seven deaths, 2,300 illnesses from *E.coli* and c*ampylobacter* poisoning.

The fix: More than $11 million spent reconstructing the town's water system and installing temporary filtration.

Judicial inquiry: To find out what went wrong and to examine overall water safety. Found that water system operators did not have adequate training to operate a water system, and they falsified records and water quality tests.

Fallout: Class action suit for up to $70 million. Government implements new water regulations. Careers ruined.

Cost: Study estimates financial cost of the tragedy at $155 million. Seven lives lost and many ongoing illnesses.

Construction accidents: Construction accidents sometimes fall into the category of a routine operating emergency. For example, when a contractor damages a water line and the system needs to shut down for repair. If the response is not timely and effective, this kind of incident can turn into a serious emergency. The system may lose pressure, resulting in serious backflow incidents that contaminate the water. You must be aware of construction in and around the system and be prepared to respond quickly if an accident occurs.

Chemical spills: Many routinely transported chemicals can harm humans directly or by contaminating air or water. No drinking water system is safe from a hazardous chemical spill and the resulting contamination. Spills can come from motor vehicles, trains, airplanes, boats, or fixed containers. They can occur at any time without warning, and many solvents can leach through PVC pipes. For example, when a small crop duster spraying a dangerous herbicide crashed into a central California river upstream from a water intake, it caused a major emergency for the city water supply.

You should evaluate the potential for chemical spills as you prepare your source water protection program and use that information for emergency response planning.

A water system may be vulnerable to many natural and man-made disasters. Understanding vulnerabilities is an important part of emergency planning. Consider the probability of each event and how it could affect your water system. While you may not find it necessary to do an extensive analysis of a rare event such as a tornado in the Pacific Northwest, analyzing the effects of an earthquake, flood, or storm is important because they happen often in Washington. Next, focus on actions you can take to reduce harm by responding in a timely and effective manner.

Example: Events that cause emergencies

Type of event	Probability or risk (High, Medium, Low)	Comments
Earthquake	High	February 2001 earthquake caused minor damages.
Flood	Low	System is not in an area vulnerable to flooding.
High winds	High	System is vulnerable to high wind events. Power disruptions.
Ice storm	Medium	Minor damage caused in December 1996. Broken pipes and damaged pump house.
Drought	Medium	Need to plan for decreased well yield during dry summers.
Terrorism	Low	Need training on how to detect suspicious activity.
Construction accident	Medium	Construction crews often hit pipes.
Chemical spill	Low	Complete Wellhead Protection Plan.

Section 5.
Severity of Emergencies

The severity of an emergency can vary widely. Defining categories of severity will help to determine appropriate response actions. Knowing the severity of the emergency and being able to communicate it to others will help system personnel keep their response balanced and effective.

System personnel should collaborate when determining the severity of an incident, but the person in charge of the emergency makes the ultimate decision. The person in charge also may choose to coordinate with external parties, especially if they formed partnerships prior to the event. The information for making the decision will accumulate over time, and may result in changing the level of severity.

Immediately after you assess severity, you must communicate your decision to all those dealing with the emergency. Make sure staff have cell phones or radios when they are in the field. Remember to have an alternative way to communicate if cell phones don't work.

In classifying the severity of an emergency, define as many levels and descriptions as you find useful. The following example is a four-level scheme for a water system supplied by groundwater. It's an example used in many settings. You may choose to classify emergencies another way. Smaller systems may prefer a three-level scheme and some larger systems may want five or more levels.

Level 1: Routine Emergency: The system experiences a routine emergency, such as a line break or power outage. System personnel can handle the problem with minimal outside assistance and the situation is unlikely to immediately jeopardize public health. Although it is important to begin responding, system personnel should remain calm and thoroughly work through the situation. Routine emergencies can usually be resolved within 24 hours.

Example: Level 1 emergency

Description: The XYZ water system considers the following as Level 1 emergencies:

- Distribution line breaks.
- Short power outages.
- Minor mechanical problems in pump houses.
- Other minor situations unlikely to jeopardize public health.

The system identified specific response activities for these types of emergencies, including proper sampling, disinfection, and pressure testing activities. The responsible person advises and directs system personnel to work on the problem. They usually can resolve the problem within 24 hours. If they determine it will take longer than 24 hours to resolve the problem and storage is likely to draw down below a safe operating level, they elevate the situation to Level 2.

Level 2: Minor Emergency (Alert Status): The system experiences a minor supply disruption or indications of possible contamination. The system may need to coordinate with us and consider issuing a health advisory to customers. These types of emergencies may jeopardize public health, so it is important for system personnel to be on alert and initiate a quick response. Minor emergencies can usually be resolved within 72 hours.

Example: Level 2 emergency

Description: The XYZ water system considers the following to be Level 2 emergencies:

- Supply disruption, such as a transmission main-line break, pump failure with a potential for backflow, and loss of pressure.
- Storage is not adequate to handle disruption in supply.
- An initial positive coliform or *E. coli* sample.
- An initial primary chemical contaminant sample.
- A disruption in chlorine or chemical feed from the groundwater sources.
- A minor act of vandalism.

Level 3: Significant Emergency: The system experiences significant mechanical or contamination problems and a supply disruption is inevitable. It is important for you to work with us to issue a health advisory to protect public health. You should report major emergencies to us as soon as possible to determine the best available ways to protect customers' health. Direct system personnel to the situation, and notify outside entities to aid in the response. Resolving a significant emergency may take more than 72 hours.

Example: Level 3 emergency

Description: The XYZ water system considers the following as Level 3 or actual emergencies:

- An *E. coli* MCL violation occurs, requiring immediate consideration of a health advisory notice to customers.
- A confirmed sample of another primary contaminant requiring immediate consideration of a health advisory notice to customers.
- A loss or complete malfunction of the surface water source treatment facilities, including chlorination.
- A major line break or other system failure that results in a water shortage or requires the system to shut down.
- Vandalism or a terrorist threat, such as intrusion or damage to a primary facility.
- An immediate threat to public health of the customers and an advisory is required.
- Abrupt decline in source capacity.

Level 4: Catastrophic Disaster or Major Emergency The system experiences major damage or contamination from a natural disaster, accident, or terrorist act. These events require immediate action. You must notify local law enforcement and local emergency management services right away. You also must quickly issue health advisories and declare a water supply emergency to protect public health. It often takes several days or weeks to resolve these issues and return the system to normal operation.

Example: Level 4 emergency

Description: The XYZ water system considers the following events to be Level 4 or major emergencies:

- Earthquake shuts the system down or affects sources, lines, and so on.
- Act of terrorism possibly contaminating the water system with biological or chemical agents.
- Flood that infiltrates system facilities and sources.
- Storm that significantly damages the power supply, water system facilities, communications or SCADA, and transportation corridors important to maintaining the system.
- Mudslide or other earth shift that causes transmission failure or loss of water in well.

Section 6.
Emergency Notification

During most emergencies, you will need to notify a variety of people quickly.

Three essential components of emergency notification:

1. Assign responsibility to oversee and carry out the notifications.
2. Assemble comprehensive call-up lists with names and contact numbers.
3. Write out procedures to disseminate information to appropriate parties quickly.

If you don't have readily available notification information, or the means to deliver it, you risk losing valuable response time. This may make the difference between minor and major damages. Having well-formed partnerships will help during these times.

In addition to phone, emails, and the media, consider forming partnerships with local community groups or other organizations able to help deliver information when needed.

Water system managers from smaller systems should poll customers to determine the best method of communicating. It is also a good idea to give customers some general safety information before an emergency occurs.

Notification call-up list
Call-up lists should be comprehensive. Include local law enforcement, the nearest Office of Drinking Water regional office, Department of Ecology spill response, local mayors and city officials, local health officials, safety officials, local emergency responders, water testing labs, and service or repair providers. You also should maintain a list of priority customers that require immediate notification, such as people with special medical needs, hospitals, nursing homes, clinics, and schools. The template in Part 2 will help you develop your call-up list.

Notification procedures
After you complete your list, it is important to describe the procedures you will use to distribute information quickly. These procedures describe how to notify specific parties, the person responsible for conducting the notifications, the person who will help with the notifications, and the methods they will use to complete them. You should have specific procedures describing how to issue a health advisory, so you are prepared to issue one when there is reason to believe the water is unsafe to drink or use. Our regional staff can help you make this decision.

You also should have procedures describing when and how to:

- Notify system personnel who may be on-call or off-duty.
- Notify customers, priority customers, and industrial customers.
- Alert local law enforcement, drinking water officials, local health officials, and water testing labs.
- Contact service and repair contractors.
- Contact neighboring water systems for assistance, if necessary.
- Arrange for alternative water supplies, such as bottled water.

Example: Procedures for notifying system customers of potential water shortage

Who is responsible:	The system manager must make the decision to notify customers about a potential water shortage and the need for water-use restrictions. The water system manager should consult with field staff to make the decision. After making the decision, we will initiate notification procedures.
Procedures:	• Water system manager confers with key staff to verify problems. • Water system manager organizes staff to develop the message delivered to the customers. • Water system manager consults with state drinking water staff about the problem. • Water system manager, with help from staff, prepares door hangers, signs, and radio message. • Water system operator continues to investigate problems and make repairs as necessary. • To distribute the water shortage notification: 1. Field staff will place “water shortage notices” on doors and along travel routes. 2. Staff will place signs on main travel routes into the community. 3. Water system manager will ask KYGO-AM radio to issue the water shortage notice and a request to curtail water use. 4. Administrative support person will provide a pre-scripted message to phone callers and log in each phone call. • Water system operator continuously updates the water system manager on water shortage. • Water system manager and staff re-notify customers when water shortage is resolved.

Section 7.
Water Quality Sampling

Many types of emergencies can jeopardize the quality of water and potentially make those who use the water ill. Because the most important goal for any water system is to protect human health, your system must know how to decide quickly whether to issue a health advisory. It's important to be prepared to sample for various water quality parameters, and to know the time it takes from collecting the sample until the analysis is complete. If you believe the water is contaminated, consult with us and consider issuing a health advisory as soon as possible. Again, it takes time to take samples and obtain results, so you may need to issue your health advisory before you know with certainty that water quality is unsatisfactory.

Drinking water contamination, whether intentional or unintentional, comes in many forms, classified in four general categories:

- Inorganics, such as metals or cyanide
- Organics, such as pesticides or volatile compounds
- Radionuclides
- Pathogenic microorganisms or microbial organisms

The drinking water rule requires all systems to have a coliform monitoring plan that designates sampling sites, procedures, lab requirements, and contact numbers. This plan should be an integral part of your emergency response plan. If you already established emergency sampling sites and procedures in your Coliform Monitoring Plan, simply reference it in the emergency response plan.

As you prepare your emergency response plan, consider the following tests:

Coliform Bacteria: In an emergency, coliform is a standard first test. If you detect coliform, it is a signal that the system may be contaminated. Coliform bacteria are organisms that are present in the environment and in the feces of all warm-blooded animals, including humans. Coliform bacteria do not cause illness, but their presence indicates that other disease-causing organisms (pathogens) may be in the water system. Most pathogens that contaminate water supplies come from human or animal feces. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. The test for coliform bacteria is quick, easy, and inexpensive. Public water systems must test for coliform bacteria regularly.

Heterotrophic Plate Count (HPC): This test provides information on the number of bacteria that may be in the water. HPC counts above 500 colonies per ml, or values substantially higher than measured in the past or elsewhere in the system, may indicate a need for further investigation.

Chlorine Residual: In chlorinated systems, this test indicates whether materials introduced into the water have created demand for chlorine, leaving lower-than-normal or no residual and signaling the need for further evaluations. Samples need to come from the point farthest from the start of the distribution system.

Chlorine Demand: In systems that routinely chlorinate, this test reveals unusual demands on the oxidizing capability of the added chlorine, indicating the presence of a contaminant that warrants further investigation.

Nitrate or Nitrite: This is a simple test. It is important to know whether these acute contaminants are present at levels that could harm infants.

Total Organic Carbon (TOC): This is a simple test. Normal, expected levels range from 0.2 to 4.0 mg/L for surface water and 0.01 to 2.0 mg/L for groundwater. Higher levels may indicate the presence of organic materials that could pose a health concern.

Total Halogenated Organic Carbon (TOX): This simple test measures halogenated organic substances, including disinfection by-products such as trihalomethanes and haloacetic acids. High levels suggest that contamination occurred or that organic materials were added to enable formation of disinfection by-products.

Cyanide: This test is not easily to perform, but you should do it immediately if you suspect cyanide contamination. Cyanide is very toxic, causing death upon ingestion.

Contact our regional office if you suspect contamination. We can help you identify what testing you should do. You can also contact the local health department for help. It is important to know the location of water-testing labs near you and their hours of operation. Be sure to locate labs that are available 24 hours a day, 7 days a week because contamination can happen any time. It is also a good idea to include the contact information for the state testing lab in your emergency notification list.

If you suspect someone intentionally sabotaged the system or contaminated the water, this may be a crime scene. Call local law enforcement and our regional office, and be sure not to disturb any potential evidence.

Determining water quality sampling readiness

Use this table to summarize how ready your system is to collect water quality samples during an emergency. Use this or a similar table to identify various water quality parameters and the steps you need to take to reach the proper state of readiness for each one. Your emergency response, and your ability to protect public health, depends on quick and comprehensive sampling consistent with the degree and type of threat.

Example: Water quality sampling preparedness table

Sampling parameter	**Do we have procedures?**	**Steps necessary for sampling preparedness** (Identify sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, and so on.)
Coliform Bacteria	Yes	Update monitoring plan for emergency sampling
Heterotrophic Plate Count (HPC)	No	We need to identify lab capacity, availability, and cost.
Chlorine Residual	Yes	Capable and ready. Re-evaluate monitoring procedures and instrument calibration with all involved staff every 12 months.
Chlorine Demand	Yes	Seldom performed. Evaluate procedures and re-supply test kits.
Nitrate or Nitrite	Yes	Capable and ready. Re-evaluate monitoring procedures and instrument calibration with all involved staff every 12 months.
Total Organic Carbon (TOC)	No	We need to identify lab capacity, availability, and cost.
Total Halogenated Organic Carbon (TOX)	No	We need to identify lab capacity, availability, and cost.
Cyanide	No	We need to identify lab capacity, availability, and cost.

Section 8.
Effective Communication

Plan ahead! Effective communication is a key element of emergency response. Make sure your emergency response plan includes a well-prepared communication strategy. When a crisis hits, it's too late. The way you communicate with your employees, customers, and reporters can affect the outcome of the situation.

As you go through your vulnerability assessment (Section 9), think about the information your customers will need during each emergency. You can establish protocols to communicate with customers and reporters, and create key messages, fact sheets, news releases, and answers to common questions long before an emergency occurs.

When you're done, you can improve your ability to communicate efficiently and successfully by taking time to develop partnerships with others in your local emergency response network. For example, make an effort to meet with local reporters to share information about your water system and your efforts to prepare for emergencies. Explain how you will communicate with them if an emergency occurs and the important role they will play informing the community. Also, contact your local emergency response agency to discuss your water system, the types of chemicals or other hazards you have on site, and the assistance you may need and expect during an emergency.

If you don't have designated communication staff, contact our regional office for help developing and communicating messages to reporters and water system customers. We can help you during these situations, allowing system staff more time to focus on sampling or repairs during the emergency.

During an emergency, your customers will have questions. Prepare for this by organizing basic facts about the crisis and your system. Assemble a team of players quickly. Include a main spokesperson and one or more people to answer customer calls. The spokesperson should be credible, in a position of authority, and trained in media interview techniques. A good practice is to train field and office staff to defer questions to the designated spokesperson.

The news media may be on-scene quickly, requesting information that will inevitably go to the public. When dealing with reporters plan your key messages carefully and coordinate them with local and state officials. The messages must be brief, clear, and accurate. If your messages are different for different audiences, be prepared to explain why they are different.

Expect your customers to be concerned or upset during a drinking water emergency. The way you communicate with people is just as important as the information you deliver. Body language, tone of voice, and expressions of sympathy all play an important role in how the public receives information.

Communication Tips

Do:

- Be prepared.
- Designate a spokesperson.
- Provide complete, accurate, and timely information.
- Tell the truth.
- Express empathy.
- Acknowledge uncertainty and offer to get back with more information later.
- Document your communications.

Do not:

- Speculate on the cause or outcome of an incident.
- Blame or debate.
- Minimize or brush-off customer concerns.
- Treat inquiries from interested parties as an annoying distraction from the real business of emergency response.

Example: Designate a spokesperson and alternates

Spokesperson	Alternate 1	Alternate 2
Marsha Ready, Manager	Mary Marshall, Office Admin.	John J. Dunbar, Operator

Example: Key messages

Develop possible messages in advance, and update them as the emergency develops:

- We are taking this incident seriously and doing everything, we can to resolve it.
- Our primary concern is protecting our customers' health.
- Another important concern is keeping the system operational and preventing damage.
- What we know right now is _____
- The information we have is incomplete. We will keep you informed as soon as we know more.
- We have contacted state and local officials to help us respond effectively.
- If you think you may be ill or need medical advice, contact a physician.
- We are sampling the water and doing tests to determine whether there is contamination.
- And so on.

Health Advisories

During events when water quality and public health are in question, you may need to issue a health advisory. The term *"Health Advisory"* means advice or recommendations to water system customers on how to protect their health when drinking water is considered unsafe. Water systems or state or local health officials issue these advisories when they believe health risks to the consumers are sufficient to warrant such advice.

Most health advisories take the form of a Drinking Water Warning or Boil Water Advisory. Communication during these times is critical. We are committed to working closely with your water system to determine whether you need to issue an advisory. Health advisories should always be well thought out and provide very clear messages.

Health advisories can be challenging and time consuming for any water system and public health partners. They are also inconvenient for customers. However, these advisories are necessary to protect public health. When determining whether to issue a health advisory, there are many things to consider and questions to answer, usually in a short time period. That's another important reason to form partnerships before an emergency occurs. If there are well-formed partnerships, it will be much easier to get information, make decisions, and get the information out to the public.

We created tools, including fact sheets, brochures, door hangers, forms, and templates to help water systems prepare to issue a health advisory. Learn about health advisories, and how to issue them, before you need them. It will make the process much smoother.

Learn more about the coliform health advisory packet online at http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/ColiformAdvisoryPacket.aspx

Drinking water after-hours hotline

Emergencies don't just happen during business hours. If you need immediate technical, engineering, or public health advice at midnight, on a weekend, or a holiday, call our emergency hotline at 1-877-481-4901. We're available around the clock to protect the health of your customers.

Section 9.
The Vulnerability Assessment

It is essential for your water system to identify and assess the vulnerability of each system component for both natural and human-caused emergencies. Vulnerability assessments have been a part of water system planning for a long time. Assessing water system vulnerability for earthquakes, floods, other natural events, and vandalism is common. EPA now requires community water systems that serve more than 3,300 people to identify vulnerabilities to terrorism. We use the term "vulnerability assessment" below to mean the process water systems use to evaluate each water system component for weaknesses or deficiencies that may make the system susceptible to damage or failure during a natural or human-caused emergency.

In conducting the vulnerability assessment, you must estimate how emergencies may affect your water system and its facilities. Another integral part of the vulnerability assessment is analyzing security enhancements that may guard your facilities against unauthorized entry, vandalism, or terrorism. This overall effort forms the basis for determining needed preventive actions or improvements and identifying response actions to take during an emergency.

Vulnerability assessment: A 4-part process

1. Identify and map the water system's components, including sources, treatment facilities, pump houses, storage reservoirs, transmission lines, distribution lines, key valves, electrical power connections, communication systems, telemetry control, and computer systems.
2. Evaluate the potential and possible effects that various emergencies (earthquake, vandalism) may have on the components. You also may want to assess how an emergency will affect your operations personnel from both a safety standpoint and the added stress of working in these conditions.
3. Define the system's expectations or set performance goals for system components in each event.
4. Identify improvements the system can make and mitigating actions that can lessen the impact of the events.

Assessing system facilities

When conducting an assessment, it is important to involve all appropriate personnel because they are the best source of information on the system's history, operating conditions, and vulnerable components. Partners, including public health agencies, can also provide valuable insight. You need to ask many questions.

- What components are aging and unreliable?
- Are prolonged power outages a high probability?
- Does the system have design flaws that make it more susceptible?
- What components are susceptible to vandalism?
- What security measures are in place?
- Are the sources and storage reservoirs fenced?
- Are entry gates and doors locked?

There are many ways to organize the assessments. For example, as you assess each component you could separate preventable and unpreventable emergency causes.

The water system can manage preventable causes to avoid emergencies. Preventable causes include aging equipment, poor maintenance, poor system design, lack of security measures such as fencing and lighting, missing spare parts, and high-risk or ill-advised land use near a water source.

Be sure to consider land usage near your water sources when you describe your vulnerable areas. You can use source protection measures to manage contaminants near your water sources. For example, consider relocating a septic system out of a sanitary radius or relocating livestock away from the source.

Unpreventable causes are beyond the water system's control. Unpreventable causes include earthquakes, droughts, floods, vandalism, terrorism, and power outages. While you cannot control these events, you can prepare for them so you are ready to act quickly to reduce damage to your system. As you complete your assessment, remember that every emergency is unique and you can never anticipate everything that may happen. Focus on understanding how to respond to the event by developing a series of quick response actions that will help protect public health and lessen the overall impact.

Integrating water system security considerations

Historically, water system security and emergency response planning focused on vandalism, contamination, and natural disasters. Now, the emphasis is on enhancing water system security to guard against vandalism and intentional sabotage. A critical step in enhancing water system security is integrating security considerations into the vulnerability assessment. This exercise helps to expand the identification of threats and define specific safeguards you can use to guard against attack.

There are many things to consider when evaluating water system security. What are the most probable threats to the system? Is it a hostile employee, vandal, terrorist, or random cyber-attack? The effects and consequences of these threats vary and require different mitigating actions.

In addition to using various water system personnel to assist in conducting the overall vulnerability assessment, you may want to include local law enforcement. A fresh view from the law enforcement perspective may identify something you overlooked. Also, look into larger community emergency response planning efforts to assist you.

It is important to identify and protect sensitive information about the water system. The last thing you want to do is give potential vandals or terrorists access to information about your system's vulnerabilities and emergency response procedures.

For more information, visit us at http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/EmergencyResponseandSecurity/SecurityLinksandPublications/ToolsandTechnicalAssistance.aspx

To help small and medium sized water systems assess their facilities and identify security measures, the Association of State Drinking Water Administrators (http://www.asdwa.org/)

and the National Rural Water Association (http://www.nrwa.org/) developed security vulnerability self-assessment guides.

Identifying vulnerabilities, improvements, and mitigating actions
The table on the next page shows a simple way to consider your system, identify the vulnerability of each component, and define what improvements or mitigating actions you can use to reduce damage.

After you complete a vulnerability assessment, use the information for financial planning or budgeting processes. Prioritize the system improvements and security enhancements identified in your vulnerability assessment and determine how and when you can fund them. Are there some that justify a rate increase? Can you use reserves to fund them? Consider these important questions as you finalize the vulnerability assessment and emergency response plan.

Example: Facility vulnerability assessment and identified improvements

System component	Description and condition	Vulnerability	Improvements or mitigating actions	Security improvements
Source	Two 150' deep groundwater wells supply the system. They are located within a few hundred feet of town and its developed areas. The sources are in excellent condition.	The wells are most vulnerable to contamination from above ground activities because they are only 150' deep. The well houses are not highly secure so they could be vulnerable to vandalism.	Implement a wellhead protection program.	Upgrade well houses: Install fencing, and deadbolts. Secure well houses to foundation and install lighting around the well house.
Storage	Storage reservoirs are in sound condition, but vandals could access reservoir hatches and break locks.	Vandals could access reservoir hatches. The reservoir could be prone to shaking and settling during an earthquake.	Provide earthquake strapping to secure reservoir to the foundation.	Install fencing, lighting, and signs to protect against unauthorized entry and access to reservoir hatches.
Treatment	There is a chlorination system in each well or pump house. Both the well and the chlorination system are in sound operating condition.	Chlorination systems are subject to power outages and vandalism if a pump house is vandalized. Tanks are unsecured and may tip over during an earthquake.	Purchase a back-up generator and have it wired in or have the system wired with a jack where we could plug-in a rented back-up generator. Secure tanks with earthquake straps.	Install fencing, lighting, and signs to protect against unauthorized entry.
Pump house and pumping facilities	The pump house and pumping facilities are in good condition.	Pump house does not have security fencing or lighting, and is prone to vandalism.		Install fencing, lighting, and signs to protect against unauthorized entry.
Computer and telemetry system	Computer and telemetry systems are located in the water system's main office. All systems are in good operating condition.	Main office does not have adequate security measures. Computers need better protection against cyber-attack or hacking.		Install lighting and security system to guard against theft and vandalism. Hire consultant to secure computers and telemetry.

Section 10.
Response Actions for Specific Events

Develop a detailed response plan for each type of emergency event your system may experience. Be sure to include the following steps in your plan for any emergency:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate action to save lives.
3. Take action to reduce injuries and system damage.
4. Make repairs based on priority demand.
5. Return the system to normal operation.

Your priority in any situation is to protect the people who use the water you produce. Use partnerships to assist in this effort. Know the various elements of emergency response planning and keep these steps in mind when developing response actions for specific events.

Establishing response actions for specific events
Numerous events could cause an emergency. Likely causes of emergencies in our state include power outages, transmission or distribution line breaks, chlorine treatment failure, surface water treatment malfunction, source pump failures, microbial (coliform, *E. coli*) contamination, chemical contamination, terrorism, vandalism, loss of water in the well, drought, floods, ice storms, earthquakes, and hazardous spills in the vicinity of sources or distribution lines.

That list is only a starting point. Each system is unique and may encounter additional situations. It depends on system size, complexity, type of source, and geographic location. It is important to be prepared.

Watch what's going on around you. If you suspect vandalism or terrorism, contact local law enforcement and make every effort to preserve evidence.

The following table presents a way to identify an event, summarize the assessment, set immediate response actions, define notifications the system needs to make, and describe important follow-up actions.

Example: Power outage

Assessment	The XYZ water system is vulnerable to power outages, experiencing an average of three outages per year that last several hours. The system does not have a back-up generator but it has a generator connection with a manual transfer switch, so it can rent a generator, plug it into the system, and isolate the utility power supply while the generator is in use. Most of the time, storage can supply the system for several hours until power is restored.
Immediate actions	Assess whether the outage is likely to last more than 6 hours. If not, be on alert for changing conditions and monitor storage tanks. If yes, complete the following steps: • Implement your Water Shortage Response Plan. Notify customers. • Call equipment rental company to find out whether a back-up generator is available. • Obtain generator and secure sufficient generator fuel. • Connect generator to system, isolate the utility power supply, and resume operations.
Notifications	1. Customers: Cut back on water usage until power is back on. 2. Equipment rental company: Obtain generator. 3. Power company: Report that a public water system is experiencing an outage. Explain that you will keep a generator turned on until the company restores power.
Follow-up actions	1. Turn off and disconnect back-up generator. 2. Return system to utility power supply via the generator connection's manual transfer switch. 3. Inspect reservoirs and pumping facilities to ensure proper operation. 4. Notify customers that utility service has been restored. 5. Return generator to rental company.

Section 11.
Alternative Water Sources

Water contamination or a supply disruption may require you to get water from an alternative source to meet your customer's basic needs. All public water systems should have a plan to provide a safe alternative water supply during an emergency if it becomes necessary. It is important to evaluate potential alternative water supplies ahead of time to ensure that they are safe.

Sources your water system may use when the primary and seasonal sources cannot meet demands are "emergency sources." Systems use emergency sources only when needed during extreme and mostly unpredictable circumstances. Alternative sources might include emergency or back-up wells, surface water sources, or springs. A water system that anticipates using an emergency source should plan and take action long before the need occurs.

If you have an emergency source of supply, document the:

- Source name, DOH source number, capacity, and location.
- Engineering design approval status.
- Person(s) in authority who will decide to activate the emergency source and begin supplying the distribution system.
- Conditions when you will activate and use the emergency source to supply the distribution system.
- Operational steps you will take before activating the emergency source and using it to supply the distribution system.
- Water quality sampling performed on an on-going basis and sampling you will perform immediately before activating the emergency source to supply the distribution system.
- Steps to notify customers and the Office of Drinking Water before activating the emergency source to supply the distribution system. Document the content of the public notice before using the emergency source.

Be aware that maintaining a physical connection between an emergency source and the distribution system should only occur when Item 1 or Item 2 apply:

Item 1: The emergency source is an emergency intertie with another approved Group A water system, approved under (WAC 246-290-132).

Item 2: **ALL** of the following conditions are met:

- The emergency source is a drilled and cased well.
- The emergency source is included in a department-approved emergency response plan.
- An isolation valve between the source and the distribution system is secured in the fully closed position.
- The motor starter is locked-out and tagged-out in the off position, isolating the pump from the power supply.

If an emergency source fails to satisfy any of these conditions, you must physically disconnect it from your distribution system by removing a pipe segment. You can use an alternate way to disconnect it with approval from our regional office. Your plan should reflect the need to request and receive permission from a local or state health official **before** supplying your distribution system from an emergency source that should be physically disconnected from your distribution system.

It's also important to consider whether the water system can establish an intertie with an approved water supply that might benefit both systems in an emergency. Discuss this possibility with adjacent water systems. Other alternatives include bottled water suppliers or a local tanker truck that could bring in water for various uses.

Example: Intertie to adjacent water supply system

Water systems within ¼ mile of our system	Feasibility of connecting
There is one water system located within ¼ mile of the XYZ water system. The XYZ distribution system is within 1,000 feet of the other water system.	XYZ system discussed installing an intertie with the adjacent water supply. The system is willing, but at this time cannot assist financially. It will cost about $10,000 to install pipe and an intertie connection. Unless the other system can assist financially, it is not feasible for the XYZ system to construct the intertie until 2016.

Example: Alternate source(s) of water

Alternative sources	Names	Phone	Availability	Is the water safe for drinking?
Bottled water suppliers	Bottled Water Inc.	360-222-2222	Up to 1,000 gallons in 1-gallon jugs within 24 hours	Yes
Tanker trucks in the area available to deliver bulk water	Fred Jones, local dairy truck	360-333-3333	5,000 gallons in less than 6 hours	Not unless the standards in DOH Publication 331-063* are met first.

** Truck Transportation: Emergency water supply for public use*

Section 12.
Curtailing Water Use

An emergency may require reduced water usage, so you should identify curtailment measures in advance. Possible measures include restrictions on landscape watering, car washing, filling of swimming pools and hot tubs, and other nonessential activities such as cleaning driveways and sidewalks. There can be various combinations of voluntary and mandatory measures. The water system should develop and formally adopt measures through ordinance, resolution, or by-laws.

As part of this effort, consider ways to inform customers about the need to curtail water use. Examples include door-to-door postings, phone contact, posting signs in visible community areas, and contacting the news media. You should pre-script your messages to ensure they are effective.

Example: Curtailing water use

Water curtailment measures	Actions
Restrict outside water usage including watering lawns, washing cars, and so on. Ask customers to limit inside usage.	When you decide it is necessary to limit water use: • Draft door hanger with limitation messages. • Post on customer doors. • Contact KYGO-AM news to announce curtailment message. • Monitor system usage and spot-check meter usage if time is available. • Continue message as long as necessary.

Section 13.
Returning to Normal Operation

When the emergency ends and you regain control, your system must prepare to return to normal operating condition. This may be a very simple or a very complex process, depending on the type and severity of the emergency. Returning to normal operation may simply mean your system restores power and disconnects the back-up generator. It could also mean your system has to obtain the proper number of satisfactory coliform tests and disinfect the system before you can lift a health advisory.

You need to consider many factors before you decide to return to normal operation. For example:

- Was your system repaired so that it can meet demand?
- Has your system operator made a safety and operational inspection of all system components?
- Did you flush, disinfect, and pressure test your system properly?
- Did you test your water adequately and follow sampling regulations?
- Does the water meet standards?
- Is there adequate staff to operate and manage the system?
- Do federal, state, and local agencies support returning to normal operation?
- Have you developed the proper public messages?

The emergency response plan should include a discussion of staff responsibilities and follow-up actions the system must take before returning to normal operation.

Example: Returning to normal operations

Action	Description and actions
Inspect, flush, and disinfect the system,	Water system operator and support staff will inspect all system facilities and ensure that all water quality tests, and necessary system flushing and disinfection are complete. Afterwards, the water system operator will report to the water system manager.
Verify water quality	Water system manager verifies water quality sampling results and decides whether the system is ready to resume normal operations.
Coordinate with the state health department	Water system manager coordinates with the state on system condition and water quality results.
Notify customers	Water system manager meets with water system operator and communications lead to write notice to customers. Water system manager directs communications lead to distribute the public notice.

Section 14.
Training and Rehearsals

Training
Emergency response training is essential. Training educates system personnel about emergencies and the ways they affect water systems. It also gives staff an opportunity to practice responses. Any training should have a purpose, appropriately selected personnel, and qualified instruction and supporting materials.

There are various ways to provide training. For example, you could attend classes or bring experienced trainers to your water system for training and exercises. On-site exercises with experienced trainers are very useful, because they involve activities specific to your water system. Personnel can practice emergency communications, isolating parts of the system, inspecting system components, and learning what to look for in case of a security breach. It is also important to train staff on risk communications and how to communicate with the media and customers during an emergency.

When you plan training, consider the system's size, the type and complexity of its components, staff needs, and operational needs. Periodic training reinforces previous efforts, as people often forget things they don't use very often. It also is an opportunity to train new staff and learn about new problems, new techniques, and changes in equipment. Be aware of current and upcoming training topics, especially hot topics that tend to come around because of a specific event.

Example: Training
Identify staff training needs and expectations.

Position	Training needs and expectations
Water System Manager	Emergency response communications, emergency response planning, issuing health advisories
Water System Operator	Emergency response communications, emergency response planning, suspicious activity training
Field support	Emergency response communications, suspicious activity training
Administrative Support	Emergency response communications, emergency response planning,

Emergency rehearsals
Emergency rehearsals are valuable tools used to ensure employees are always prepared to respond. Ideally, the water system manager sets up unannounced rehearsals for employees. During these rehearsals, employees conduct actual responses. They make phone or radio calls, perform inspections, respond to inquiries, and do other tasks. Get assistance from partners such as local health and local emergency response people.

Practicing for an emergency is the only real way to evaluate your emergency response plan and the system's ability to implement it. The final step of a rehearsal is to evaluate and discuss the results. Conduct a staff meeting to go over the results and get input from those involved in the rehearsal. Then make modifications or set up training to be better prepared.

Example: Emergency rehearsals
Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved	Date
Rehearsal	Conduct actual emergency drill	Water system staff	Unannounced
On-site training drills	Conduct specific drills, such as communications, water line breaks, and sampling with a professional trainer	Water system staff and professional trainer	May 2016

Section 15.
Plan Approval

The manager, owner, board members, commissioners, council members, and other representatives responsible for the water system should review, approve, and sign the emergency response plan. This demonstrates support for the plan, acknowledges the effort put into preparing the plan, and makes it official.

Be sure to secure and protect the emergency response plan because it may contain sensitive information about facilities and response activities. You need to protect that information to safeguard the water system.

Example: Plan approval

This plan is official after the following people review, approve, and sign it:

Name/Title	Signature	Date
Marsha Ready Water System Manager	*Marsha Ready*	March 1, 2016
Bob Jones Chairman Water Commissioners	*Bob Jones*	March 1, 2016

Part 2: Planning Template

Introduction

Preparing an emergency response plan is an essential part of managing your drinking water system. We provide this template to all public water systems in the state to help them develop plans.

How to use the template

The template follows the outline in Part 1 of this document. Part 1 discusses key components of emergency planning and uses examples to show you how to present information in your plan. Use Part 1 as a tool to learn about emergency planning and then fill out this template as you go through your planning process.

The template is just a guide; you may modify it in any way that works for you—add sections, take them out, or rearrange them if you wish. You may also use a completely different format for your plan if you find one that works better for your system.

The template is online at http://www.doh.wa.gov/portals/1/Documents/pubs/331-211.pdf

Section 1.
Emergency Response Mission and Goals

Use the mission statement and goals to help focus emergency planning and response.

Emergency response mission and goals

Mission statement for emergency response	
Goal 1	
Goal 2	
Goal 3	
Goal 4	

Section 2.
System Information

Keep this basic information readily available for when you need it for emergency responders, repair people, and the news media.

System information

System identification number		
System name and address		
Directions to the system		
Basic description and location of system facilities		
Location and Town		
Population served and service connections	People	Connections
System owner **Should be a person's name**		
Name, title, and phone numbers of person responsible for maintaining and implementing the emergency plan.		( ) - Phone ( ) - Cell ( ) - Pager

Section 3.
Chain of Command and Lines of Authority

The first response step in any emergency is to inform the person at the top of this list, who is responsible for managing the emergency and making key decisions.

Chain of command and lines of authority

Name and title	Responsibilities during an emergency	Contact numbers
		(___) ___-____Phone (___) ___-____ Cell (___) ___-____ Pager
		(___) ___-____Phone (___) ___-____ Cell (___) ___-____ Pager
		(___) ___-____Phone (___) ___-____ Cell (___) ___-____ Pager
		(___) ___-____Phone (___) ___-____ Cell (___) ___-____ Pager
		(___) ___-____Phone (___) ___-____ Cell (___) ___-____ Pager

Section 4.
Events that Cause Emergencies

The events below may cause water system emergencies. They appear in order from highest to lowest probable risk.

Events that cause emergencies

Type of event	Probability or Risk (High, Medium, Low)	Comments

Section 5.
Severity of Emergencies

System personnel should collaborate when determining the severity of an incident, but the person in charge of the emergency makes the ultimate decision. The information for making the decision will accumulate over time, and may result in changing the severity assessment.

Communicate each severity assessment immediately to all those dealing with the emergency. Make sure staff have cell phones, pagers, or radios when they are in the field.

Level 1: _____ (Definition)

Description:

Level 2: _____ **(**Definition)

Description:

Level 3: _____ **(**Definition)

Description:

Level 4: _____ **(**Definition)

Description:

Section 6.
Emergency Notification

Notification call-up lists

Use these lists to notify important parties of an emergency.

Local notification list

Local law enforcement	Day (___) ___-____	Night (___) ___-____
Fire department	Day (___) ___-____	Night (___) ___-____
Ambulance service	Day (___) ___-____	Night (___) ___-____
Local Health Department	Day (___) ___-____	After hours (___) ___-____
Water testing laboratory	Day (___) ___-____	After hours (___) ___-____
Local emergency management	Day (___) ___-____	After hours (___) ___-____
Water system operator	Day (___) ___-____	Night (___) ___-____
Neighboring water system	Day (___) ___-____	Night (___) ___-____
Neighboring water system	Day (___) ___-____	Night (___) ___-____
News media contact:	(___) ___-____	
Local radio station:	(___) ___-____	
Other:	(___) ___-____	

State notification list

State police	Day (___) ___-____	Night (___) ___-____
Office of Drinking Water (regional office)	Day (___) ___-____	After hours (___) ___-____
State testing laboratory	Day (___) ___-____	After hours (___) ___-____
Other:	Other: (___) ___-____	

Service and repair notification list

Electrician	Day ( ) -	Night ( ) -
Electric utility	Day ( ) -	Night ( ) -
Plumber	Day ( ) -	Night ( ) -
Pump specialist	Day ( ) -	Night ( ) -
Soil excavator	Day ( ) -	Night ( ) -
Equipment rental	Day ( ) -	Night ( ) -
Other	( ) -	
Other	( ) -	

Notification procedures

Notify water system customers

Who is Responsible:	
Procedures:	

Alert local law enforcement, state drinking water officials, and local health

Who is Responsible:	
Procedures:	

Contact service and repair contractors

Who is Responsible:	
Procedures:	

Contact neighboring water systems (if necessary)

Who is Responsible:	
Procedures:	

Procedures for issuing a health advisory

Who is Responsible:	
Procedures:	

Other procedures (as necessary)

Who is Responsible:	
Procedures:	

Section 7.
Water Quality Sampling

If you suspect contamination, notify and work with the local health department and our regional office to identify the testing you should do. This may help prevent illness or even death.

Water quality sampling

Sampling parameter	Do we have procedures?	Basic sampling steps (sites, frequency, procedures, lab requirements, lab locations, contacts, and so on.)
Coliform Bacteria	**Yes or No**	
Heterotrophic Plate Count (HPC)	**Yes or No**	
Chlorine Residual	**Yes or No**	
Chlorine Demand	**Yes or No**	
Nitrate or Nitrite	**Yes or No**	
Total Organic Carbon (TOC)	**Yes or No**	
Total Halogenated Organic Carbon (TOX)	**Yes or No**	
Cyanide	**Yes or No**	

Section 8.
Effective Communication

Communication with customers, the news media, and the public is a critical part of emergency response.

Designated public spokesperson

Designate a spokesperson (and alternates) to deliver messages to the news media and the public (see Section 6 for news media contacts in local notification list).

Designate a spokesperson and alternates

Spokesperson	Alternate 1	Alternate 2

Key messages

Develop possible messages in advance, and update them as the emergency develops:

-
-
-
-
-
-

Health advisories
If water quality and human health are in question, your water system may need to issue a health advisory to let customers know how they can protect themselves. Water system or state or local health officials issue these advisories when they believe health risks are sufficient to warrant such advice.

Most health advisories take the form of a drinking water warning or boil water advisory. Communication during these times is critical. Health advisories should always be well thought out and provide very clear messages.

We created tools, including fact sheets, brochures, forms, and templates to help you prepare for a health advisory. These tools are online at http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/EmergencyPublicationsforWaterSystems.aspx

Section 9.
The Vulnerability Assessment

This is an evaluation of each water system component to identify weaknesses or deficiencies that may make them susceptible to damage or failure during an emergency. It also assesses facilities for security enhancements that may guard against unauthorized entry, vandalism, or terrorism.

Facility vulnerability assessment and improvements identification

System component	Description and condition	Vulnerability	Improvements or mitigating actions	Security improvements
Source				
Storage				
Treatment				
Pump house and pumping facilities				
Computer and telemetry system				
Other considerations				

Section 10.
Response Actions for Specific Events

In any event, there are a series of general steps to take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate action to reduce injuries, save lives, and prevent system damage.
3. Make repairs based on priority demand.
4. Return your system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define necessary notifications, and describe important follow-up actions.

A. Power outage

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

B. Transmission or main break

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

C. Distribution line break

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

D. Chlorine treatment equipment failure

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

E. Treatment equipment

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

F. Source pump failure

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

G. Microbial (coliform, *E. coli*) contamination

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

H. Chemical contamination

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

I. Vandalism or terrorist attack

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

J. Reduction or loss of water in the well

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

K. Drought

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

L. Flood

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

M. Earthquake

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

N. Hazardous materials spill in vicinity of sources or system lines

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

O. Electronic equipment failure

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

P. Cyber-attack

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

Q. Other

Assessment	
Immediate actions	
Notifications	
Follow-up actions	

Section 11.
Alternative Water Sources

Intertie to adjacent water supply system

Water systems within ¼ mile of our system	Feasibility of connecting

Emergency source evaluation
Complete this evaluation form for each emergency source you may activate in an emergency:

Source Number:	**Source Name:**
Engineering design approval status:	
Is the emergency source an intertie with an approved Group A water system? **Yes or No** **If yes,** skip the remainder of this evaluation.	
The person(s) in authority who will decide to activate the emergency source and begin supplying the distribution system:	
Describe the conditions when you will activate and use the emergency source to supply the distribution system:	

The operational steps you will take before you activate and use the emergency source to supply the distribution system:
The water quality sampling you perform on an on-going basis and the sampling you will perform immediately before activating the emergency source to supply the distribution system:
Steps the system will take to notify the public and the Office of Drinking Water before activating the emergency source to supply the distribution system, including the content of the public notice:

Copy this table for each emergency source:

Attribute of Source No _____	**Current Status**
Is the emergency source physically connected to the distribution system?	**Yes or No**
Is the emergency source a drilled and cased well?	**Yes or No**
Is there an isolation valve between the source and the distribution system?	**Yes or No**
If so, is the valve secured in the fully closed position?	**Yes or No**
Is the motor starter locked-out and tagged-out in the off position isolating the pump from the power supply?	**Yes or No**

Summary of all possible alternative source(s) of water

Alternative source	Names	Phone	Availability	Is the water safe to drink?
		( ) -		**Yes or No**
		( ) -		**Yes or No**
		( ) -		**Yes or No**
		( ) -		**Yes or No**
		( ) -		**Yes or No**
		( ) -		**Yes or No**

Section 12.
Curtailing Water Usage

Curtailing water use

Water curtailment measures	Actions

Section 13.
Returning to Normal Operation

Returning to normal operations

Action	Description and actions

Section 14.
Training and Rehearsals

Training

Identify staff training needs and expectations.

Position	Training needs and expectations
Water System Manager	
Water System Manager	
Field support	
Administrative support	

Emergency rehearsals

Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved	Date

Section 15.
Plan Approval

Plan approval

This plan is official when the following people review, approve, and sign it:

Name and Title	Signature	Date