State of Connecticut

Department of Public Health

# Emergency Response Planning Guide for Public Drinking Water Systems

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CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

Keeping Connecticut Healthy

www.dph.state.ct.us

Governor John G. Rowland

Commissioner J. Robert Galvin, M.D., M.P.H.

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STATE OF CONNECTICUT
Department of Public Health
Drinking Water Division

The State of Connecticut, Department of Public Health's Emergency Response and Planning Guide for Public Water Systems was adapted from materials developed by the Washington State Department of Health. This guide book was revised in partnership with EPA Region 1, Federal, State, and local law enforcement agencies, CT Department of Environmental Protection, CT Local Health Directors, CT Section of the American Water Works Association, and the Atlantic States Rural Water and Wastewater Association, who all comprise the Connecticut Department of Public Health's Drinking Water Security and Emergency Response Committee.

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# Part 1: Guidance and Instructions

## Introduction: Protecting public health

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

Most public water systems have had routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages. These are manageable if the water system has an emergency response plan that can be put into action quickly.

More serious non-routine emergencies may result from intentional acts of sabotage, chemical spills, floods, hurricanes, windstorms, or droughts. These can drastically affect the system and the community that depends on it.

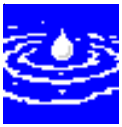
Each emergency has unique effects on different parts of a water system. Floods can cause widespread bacterial contamination, sabotage can damage sources and distribution systems, and storms can disrupt power supplies. The common element is that each emergency may threaten the system's ability to deliver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

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

## The Requirement for a water supply emergency contingency plan

The Regulations of Connecticut State Agencies Section 25-32(d)-3(d), requires each water company supplying water to 1,000 or more persons or 250 or more consumers, to have a water supply emergency contingency plan as part of a water supply plan. The regulation requires that the plan identify critical system components and establish procedures for sabotage prevention and response.

This guidance document can be used to help meet the requirement for developing a water supply emergency contingency plan. Other methods or formats can also be used to meet this requirement.



## How to use this document

Developing a water supply emergency contingency plan can take a lot of time and effort. The purpose of this document is to make the job easier and help create a plan that works for your water system. The document is intended for use by any water system and may be modified to fit the specific needs of each system. Larger water systems should use it only 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 the system.

The document has two main parts with identical structure. Part 1 discusses important emergency response planning elements and provides instructions and examples to help complete Part 2, which 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 needed for a well thought-out plan.

You may use Part 2 in its original form or modify it to meet your system's needs. Since the completed Part 2 may contain sensitive information, make sure to keep it stored in a safe and secure location. It is recommended you have one copy stored on-site and one off-site to ensure the document is available in the event you are unable to access your offices or facilities.

# Section 1.
# Emergency response mission and goals

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

System personnel should begin by understanding what needs to be accomplished during an emergency. Protecting your customers' health is paramount. If the water has been contaminated, you must notify customers quickly. Then you must resolve the situation at hand and restore safe and reliable water throughout the system.

**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 result in contamination of the water or disruption of supplying water. |
| **Goal 1** | Be able to quickly identify an emergency and initiate timely and effective response action. |
| **Goal 2** | Be able to quickly notify local, state, and federal agencies to assist in the response. |
| **Goal 3** | Protect public health by being able to quickly determine if the water is not safe to drink or use and being able to immediately notify customers effectively of the situation and advise them of appropriate protective action. |
| **Goal 4** | To be able to 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. In any event, there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions 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.

# Section 2.
# System Information

In any emergency, a water system needs to have basic information available for both system personnel, and external parties such as emergency responders, repair people, the media, and others. The information needs to be clearly formatted and readily accessible so system staff can quickly find it and provide it to those who may be involved in responding to the emergency. Providing this information in advance is an important step in forming partnerships.

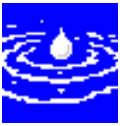
Basic information that should be presented in the emergency response plan are the system's Public Water System ID number, system name, system address or location, directions to the system, population served, number of service connections, system owner, certified operator, and information about the person in charge of managing the emergency.

## Example: System information

| | | |
|---|---|---|
| **System identification number** | CT9999999 | |
| **System name and address** | XYZ Water System<br>1000 Anywhere Street<br>XYZ, WA 98000 | |
| **Directions to the system** | North on route 6 to exit 88. Take 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** | The 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 located at the end of J street and the south reservoir is located and the intersection of Olive Street and 2nd Street. | |
| **Location/Town** | XYZ | |
| **Population served and service connections from Division of Drinking Water records.** | 650 people | 225 connections |
| **System owner (the owner should be listed as a person's name)** | Town of XYZ | |
| **Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.** | Marsha Ready<br>Manager | (203) 232-2323 Phone<br>(203) 790-2323 Cell<br>(203) 799-8999 Pager |

The information in this table is a starting point. The system may have unique circumstances, or it may have a geographical range that expands over a large area requiring additional information. In any case, make sure the information is clear, accurate, and easily located.

In addition to this basic information, the water system should have a detailed map of the distribution system and a plan for how to communicate if phones and radios don't work. For example, arrange places to meet and designate less technical ways to share and distribute information.



# Section 3.
# Chain of Command - 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 the emergency to, who manages the emergency, who makes decisions, and what their own responsibilities are.

**The first response 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 a variety of persons involved in the chain of command. However, a small system may only have one or two people in the chain of command. It is likely that very small systems may only have one person, usually the water system operator, in their chain of command. In these cases make sure each responsibility is clearly defined so the person does not forget it during an emergency.

In addition to an individual having the lead responsibility, other key responsibilities that should be assigned to system personnel include the following tasks:

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

**Example: Chain of command – lines of authority**

| Name and title | Responsibilities during an emergency | Contact numbers |
|---|---|---|
| Marsha Ready<br>Water System Manager | Responsible for overall management and decision making for the water system. The Water System Manager is the lead for managing the emergency, providing information to regulatory agencies, the public and news media. All communications to external parties are to be approved by the water system manager. | Phone:<br>(360) 232-2323<br>Cell:<br>(360) 790-2323<br>Pager:<br>(360) 799-8999 |
| John J. Dunbar<br>Water System Operator | In charge of operating the water system, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the water system manager. | |
| Freddy Filter<br>Water Treatment Plant Operator | In charge of running water treatment plant, performing inspections, maintenance and sampling and relaying critical information, assessing facilities, and providing recommendations to the water system operator or manager. | |
| Mary Marshall<br>Office Administrator | Responsible for administrative functions in the office including receiving phone calls and keeping a log of events. This person will provide a standard carefully pre-scripted message to those who call with general questions. Additional information will be released through the water system manager. | |
| Jerry Mander<br>Field Staff | Delivers door hangers and supports water system operator. | |

# Section 4.
# Events that Cause Emergencies

Why do emergencies happen? There are a variety of reasons including:

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

An emergency may affect the entire water system or only isolated sections. You should evaluate a variety of events regarding their potential effects on the water system and its infrastructure. Each type of event can cause different types of damage to system components or contamination resulting in a disruption in service. These evaluations should be reflected in the water system's vulnerability assessment and procedures for responding to specific events that are discussed later in this document.

**Natural Disasters**

Consider common natural disasters when developing an emergency response plan, including: ***Earthquakes:*** Damage resulting from the earth shifting along geologic faults resulting in shaking and settling of the ground can cause severe structural damage to virtually all water system facilities, including sources, transmission and distribution lines, storage reservoirs, and pump-houses. An earthquake near Massena, New York, in September 1944 was felt over a wide region. Mild effects were noticed by residents of Hartford, New Haven and Meriden, Connecticut. At its epicenter, the shock destroyed nearly all chimneys, crippled several buildings, and caused $2 million property damage in that region. An intensity V earthquake in southern Connecticut occurred on November 3, 1968, at about 3:30 in the morning. Plaster cracked at Madison, furniture shifted at Chester, and small items fell and broke. Although no major outages were reported, it was a serious reminder that these things can and do happen.

### Waterborne Illness in Walkerton, Ontario (2000)

**What happened:** Storm washes bacteria-laden cow manure into poorly planned and maintained well. Water pumped to taps throughout the town of Walkerton. Operational problems included inconsistent treatment of the water, 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 in reconstructing 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 were not trained to adequately operate a water system, and they falsified records and water quality tests.

**Fallout:** Class action suit for as much as $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.

Emergency response plans should evaluate what facilities are at risk during an earthquake, what can be done to mitigate impacts and what actions can be taken 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 can be common in New England, especially along the Connecticut River. 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 also can 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.

Another consideration is identification of alternative transportation routes to get in and out of the area.

***Hurricanes, Tornadoes, and High-Winds:*** In New England, storms can generate winds in excess of 50 miles an hour and can exceed hurricane-force sustained winds of 74 miles an hour or greater, and can spawn tornadoes from time-to-time. These storms often disrupt power and damage water system facilities.

***Ice Storms:*** There are occasional ice storms in New England, such as the one that hit in November 2002. This fierce storm caused major power outages and froze water pipes. The ice slowed the ability of crews to get to areas to make repairs.

***Drought:*** Droughts are an issue in New England and can have devastating effects on water supplies. During normal years, peak summer demands can double and even triple water use. These same demands during low water years, such as in the summer of 2002, can lead to water shortages. Drought severity is affected by a combination of environmental factors, all of which change over time, including rainfall, temperature, snow pack, and length of drought. Compared to other natural disasters, drought has a relatively slow onset and is easier to anticipate.

***Waterborne diseases:*** Organisms such as *Giardia* and *Cryptosporidium* can contaminate water supplies and cause waterborne diseases. The 1993 Milwaukee, Wisconsin *Cryptosporidium* outbreak killed more than 100 people and sickened more than 400,000. Another incident occurred in Walkerton, Ontario where an E. coil outbreak killed seven people and sickened over 2,300 (see sidebar on previous page). Both of these 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:*** Vandalism is generally a spur-of-the-moment act using materials at hand rather than pre-planned or pre-meditated activities. Vandals often break into systems and damage facilities. These acts are relatively easy to prevent by enhancing security, increasing lighting, installing locks on doors and hatches, and putting up security fencing.

***Terrorism:*** Acts of terrorism are conducted by someone whose intent is to instill fear or induce harm to people and facilities. Acts of terrorism are a very real threat in America. Even though it may seem unlikely, it would only take one well-staged event to undermine confidence in 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 threats to drinking water systems, including chemical, biological or radiological contamination as well as 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. The threat is real, and drinking water systems need to enhance security around facilities and be prepared to respond.

***System neglect:*** System neglect, often referred to as deferred maintenance, is a major cause of emergencies. System components that are aging and need replacement go without attention for so long that they fail, causing an emergency. Drinking water systems need to continuously evaluate facilities and replace them before a massive failure occurs. In one case, a drinking water system continuously put off repairing its 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 non-potable liquid, solid, or gas that could potentially contaminate water supply through a backflow process. Cross connections usually occur unknowingly when someone makes a connection in the system. Backflow is the reverse flow of water or other substances 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 there is a loss of pressure somewhere in the system causing water to reverse itself.

### Security Breach in Glen Rose, Texas (2002)

**The incident:** One night, someone cuts a fence around one of the town's reservoir sites, climbs a 25-foot 200,000-gallon tank, and opens a locked hatch. City unable to quickly determine if a public health threat exists.

**Actions taken:** EPA alerted, along with FBI, Texas Department of Health, Natural Resource Commission, and Department of Homeland Security. EPA assembles a response team of drinking water experts to evaluate the water supply. Water in the tanks isolated, and analysis conducted to determine if water is safe to drink. Investigation begun to determine if this is terrorist activity.

**Questions:** What kinds of sampling should be conducted? Who has the expertise to do the analysis? How long does it take to get test results?

**Analysis conducted:** Traditional drinking water parameters, hazard characterization (HAZCAT), radiation, warfare agents. Forensics include light/polarized microscopy, infrared analysis, electron microscopy, and x-ray diffraction.

**Difficult issues:** Fire fighting vulnerability from low volume, identifying sensitive customers, maintaining acceptable water pressure, customers unhappy with the length of the incident.

**Results:** All lab tests negative. City, state agencies, and EPA discuss findings and conclude the water is not a threat to health.

Tank drained, cleaned, disinfected, and placed back on-line after ten days.

***Construction accidents:*** Construction accidents sometime fall into the category of a routine operating emergency. For example, when a contractor damages a water line and the system needs to be 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. The utility must be aware of construction in and around the system and be prepared to respond quickly to an accident if it happens.

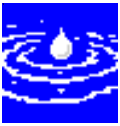
***Chemical spills:*** Many chemicals that are routinely transported can harm humans directly or by contaminating air or water. No drinking water system is safe from a hazardous chemical spill and the resulting contamination. Spills can come from motor vehicles, trains, airplanes, boats, or fixed containers. They can occur at any time without warning, and many solvents are able to leach through PVC pipes.

Water systems should evaluate the potential for chemical spills in their watershed and wellhead protection areas and use that information for emergency response planning.

A water system may be vulnerable to many natural and man-made disasters. Understanding these vulnerabilities is an important part of emergency planning. In preparing a plan, you may not consider it necessary to do an extensive analysis of a rare event such as a tornado or earthquake in New England. However, analyzing the impacts of a flood or storm is important because they happen quite often in Connecticut. Consider the probability of an event and its likely effect on the water system. Then focus on the actions needed to reduce impacts and respond in a timely and effective manner.

**Example: Events that cause emergencies**

| Type of event | Probability or risk (High – Med – Low) | Comments |
|---|---|---|
| High winds/ Hurricanes | High | System is vulnerable to high wind events. Power is disrupted. |
| Earthquake | Low | Never had earthquake damage. |
| Flood | Low | System not located in an area vulnerable to flooding. |
| Ice storm | Med | Minor damage caused in December 1996. Broken pipes and damaged pump house. |
| Drought | Med | Need to plan for decrease I well yield during dry summers. |
| Terrorism | Low | Need to be trained on suspicious activity |
| Construction accident | Med | Construction crews often hit pipes. |
| Chemical spill | Low | Complete wellhead protection plan. |



# Section 5.
# Severity of Emergency

Emergencies usually have a wide range of severity. Defining categories of severity can significantly aid in determining 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.

Making a decision on severity should be collaborative among system personnel, but is ultimately made by the person in charge of the emergency. The person in charge may also choose to coordinate with external parties, especially if partnerships have been formed in advance of the event. The information for making the decision will accumulate over time, and may result in the level of severity being changed.

An assessment of severity, once decided, must be communicated immediately to all those dealing with the emergency. Make sure staff have cell phones, pagers, and/or radios when they are in the field. Remember to have an alternative method of communicating if cell phones and pagers won't work.

In classifying the severity of an emergency, define as many levels and descriptions as you find useful. In Connecticut, your water supply emergency contingency plan should already address emergencies due to contamination of water, power outages, drought, flood or failure of any or all critical system component. This water supply emergency contigency plan must inlcude;

(1) A list identifying critical system components and potential water supply emergencies that may affect them including contamination, power outages, drought, flood or failure, but excluding routine events, such as water main breaks and inoperable valves;

(2) a description of the level of service to be sustained during water supply emergencies, including identification of priority users, procedures for public notification of priority users, and the means for provision of essential potable water to priority users where priority is based on the potential risk to health, safety and welfare posed by the curtailment of service; and procedures for advance notice to users for which service may be suspended if rationing is required and for implementation of rationing and use bans;

(3) procedures for responding to toxic spills or hazardous materials that may contaminate a watershed or aquifer used for drinking water;

(4) an inventory of equipment needs and availability, including location of existing emergency equipment, generators and spill response materials, identification of additional emergency equipment needs, and procedures for obtaining additional equipment or services;

(5) a list prioritizing emergency sources, including interconnections and independent industrial and commercial water supplies within the service area, and describing contractual, technical and financial requirements for their use, a schedule for activation, available yield and known water quality problems or limitations;

(6) procedures for notification of local, state and federal officials and the public;

(7) a description of duties and responsibilities of key personnel involved in emergency response actions, and a procedure for contacting and scheduling staff;

(8) a description of five stages of response during water supply emergencies of increasing severity, including identification of trigger levels which initiate each stage based on water supply availability, reservoir storage levels, or critical operational indicators, including storage tank recovery, pumping capacity, or for groundwater dependent systems, the number of hours of continuous well pump operation. The five stages of response shall include: a water supply alert, a water supply advisory, a water supply emergency—phase I, a water supply emergency—phase II, and a water supply emergency—phase III. Triggers shall give sufficient lead time to adequately implement response actions.

Also, the plan shall include the following stages and actions unless otherwise approved by the Connecticut Departmen of Public Health, Drinking Water Division;

**Level I – Alert:** a list of actions to be taken in a water supply alert, including contacting the department, measures to evaluate the water supply availability and demand situation, review and update of water supply emergency contingency plan, and developing media information plan.

**Level II – Advisory:** a list of actions to be taken in a water supply advisory, including contacting the department, reevaluation of emergency source options, schedule for obtaining emergency equipment, implementation of internal measures to maximize use of existing active sources, promotion of voluntary conservation in residential, commercial and industrial facilities to reduce demand by ten percent from previous nondrought average for the appropriate month, preparation for mandatory conservation including necessary enforcement mechanisms, activation of the budget process for funding necessary projects and those actions required under a water supply alert

**Level III – Emergency-Phase I:** a list of actions to be taken in a water supply emergency—phase I, including contacting the department, preparing emergency sources for use, implementation of first phase of mandatory conservation to reduce demand by an additional five percent for a total of fifteen percent from previous nondrought average for the appropriate month, coordination with local officials concerning alternative facilities for obtaining water, reevaluation of priority among users and those actions required under previous water supply emergency contingency plan stages.

**Level IV – Emergency Phase II:** a list of actions to be taken in a water supply emergency—phase II, including contacting the department, activation of emergency sources upon department approval, institution of second phase of mandatory conservation to reduce demand by an additional five percent for a total of twenty percent from previous non-drought average for the appropriate month, initiation of weekly reporting of reservoir water supply status to the department and those actions required under previous water supply emergency contingency plan stages.

**Level V – Emergency Phase III:** a list of actions to be taken in a water supply emergency—phase III, including contacting the department, activation of emergency sources upon department approval, institution of third phase of mandatory conservation including rationing of water, coordination with local officials for the provision of emergency services for bathing and obtaining drinking water for the highest priority users and those actions required under previous water supply emergency contingency plan stages

# Section 6.
# Emergency Notification

During most emergencies, it will be necessary to quickly notify a variety of parties.

Preparation for such notification has three essential components:

- Assigning responsibility to oversee and carry out the notifications.
- Assembling comprehensive call-up lists with names and contact numbers.
- Writing out procedures for quickly disseminating information to appropriate parties.

If you don't have readily available notification information or the means to deliver it, you run the risk of 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, email, and media for notification, consider forming partnerships with local community groups, scout troops, and school clubs to assist in delivering information when needed.

Water system managers from relatively small systems should poll customers to determine the best method of communicating. It is also a good idea to give customers some general safety information regarding what to do in case of an emergency before one happens.

**Notification call-up list**

Call-up lists should be comprehensive, including federal, state and local law enforcement, DPH Drinking Water Divsion office and DPH after hours phone, Department of Environmental Protection spill response, local mayors and city officials, local health officials, safety officials, local emergency responders, water testing laboratories, and service/repair providers. A list of priority customers, such as hospitals, nursing homes, clinics, and schools should also be maintained for immediate notification. The template in Part 2 has comprehensive lists to assist you. You may modify them as necessary.

**Notification procedures**

Once you have your list completed it is important to describe the procedures you will use to quickly distribute information to appropriate parties. These procedures describe how to make notifications to specific parties, who is responsible for conducting the notifications, who assists in the notifications, and what methods are used to complete them. In addition, specific procedures on how to issue a health advisory should be defined so that you are prepared to do so in the event that your water supply is unsafe for drinking or use. Issuing a health advisory should be done by the water system when there is reason to believe the water is unsafe. DPH staff members are available for consultation in making this decision.

**Other procedures to define include:**

- Notifying system personnel who may be on-call or off-duty.
- Notifying customers, priority customers, and industrial customers.
- Alerting local law enforcement, drinking water officials, local health officials, and water testing laboratories when appropriate.
- Contacting service and repair contractors.
- Contacting neighboring water systems for assistance, if necessary.
- Arranging for alternative water supplies such as bottled water.

**Example: Procedures for notifying system customers of potential water shortage**

| | |
|---|---|
| **Who is responsible:** | The water system manager is ultimately responsible for making the decision to notify customers regarding a potential water shortage and the need for water use restrictions. The water system manager should consult with field staff to make the decision. Once the decision is made procedures for notification will be initiated. |
| **Procedures:** | • Water system manager confers with key staff to verify problems.<br>• Water system manager organizes staff to develop the message to be delivered to the customers.<br>• Water system manager consults with state drinking water staff regarding the problem.<br>• Water system manager with assistance from staff prepares door hangers, signs and radio message.<br>• Water system operator continues to investigate problem and make repairs as necessary.<br>• The water shortage notification will be distributed by:<br>1. Field staff placing "water shortage notices" on doors and along travel routes.<br>2. Staff will place signs on main travel routes into the community.<br>3. Water system manager contacts KYGO am radio and requests issuance of the water shortage notice and request to curtail water use.<br>4. Administrative support person will provide a pre-scripted message to phone callers and log in each phone call.<br>• Water system operator continuously updates the water system manager on water shortage.<br>• Once water shortage is resolved, re-notify customers. |

# Section 7.
# Water Quality Sampling

Many types of emergencies can jeopardize the quality of water and potentially sicken those using the water. Because the most important goal for any water system is to protect human health, the system must know how to act quickly and make decisions on whether to issue a health advisory. Sampling and obtaining results from a lab takes time.

If there is reason to believe that the water has been contaminated, the water system manager should consult with DPH and consider issuing a health advisory as soon as possible – often before conducting water quality sampling.

Contamination of drinking water, whether intentional or unintentional, comes in many forms, which are classified in four general categories:

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

If the water system is experiencing an emergency caused by a natural event or intentional act and contamination is suspected, system personnel may be faced with making a decision about what contaminants to test for and how to get the tests performed quickly.

All systems must have a coliform bacteria monitoring plan, as required by drinking water regulations, that designates sampling sites, procedures, laboratory requirements, and contact numbers. This plan should be an integral part of your emergency response plan. If you already have emergency sampling sites and procedures established in this plan, simply reference it in the water supply emergency contingency plan.

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

***Coliform Bacteria:*** In the event of an emergency, testing for coliform is a standard first test, and if coliform is detected 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 generally 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 the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is, however, relatively quick, easy, and inexpensive to test water for coliform bacteria. Public water systems must test for coliform bacteria regularly.

***Hetertrophic Plate Count (HPC):*** This test provides information regarding the numbers of bacteria that may have been introduced into the water. HPC counts greater than 500 signal the need to be wary. Very high levels (1000 – 10,000 and greater) would suggest a problem that needs immediate evaluation.

***Chlorine Residual:*** In chlorinated systems, this test indicates if materials introduced into the water have created a demand for the chlorine, leaving lower-than-normal or no residual and signaling the need for further evaluations. Samples need to be taken at the distal end of the distribution system (the point farthest from the start of the distribution system).

***Chlorine Demand:*** In systems that do not 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/Nitrite:*** This test is relatively easy to perform. It is important to know whether these acute contaminants are present at levels that could harm infants.

***Total Organic Carbon (TOC):*** Relatively simple to perform, this test measures 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):*** Relatively simple to perform, this test measures the halogenated organic substances, including disinfection by-products such as trihalomethanes and haloacetic acids. High levels suggest that contamination has occurred or that organic materials have been added to enable formation of disinfection byproducts.

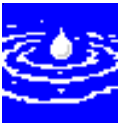
***Cyanide:*** This test is not easily performed, but should be done immediately if cyanide contamination is suspected. Cyanide is very toxic, causing death upon ingestion.

If contamination is suspected, the DPH Drinking Water Division office is available to help you identify what testing should be done. You can also contact your local health department for assistance if needed. It is important to know where water testing laboratories are located near you and their hours of operation. Be sure to locate laboratories that are available 24 hours a day 7 days a week because contamination can happen at 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 your local law enforcement and the DPH Drinking Water Division office, and be sure not to disturb any potential evidence.

**Example: Water quality sampling**

| Sampling parameter | Do we have procedures? Yes/No | Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.) |
|---|---|---|
| Coliform Bacteria | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Hetertrophic Plate Count (HPC) | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Chlorine Residual | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Chlorine Demand | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Nitrate/Nitrite | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Total Organic Carbon (TOC) | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Total Halogenated Organic Carbon (TOX) | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |
| Cyanide | Yes | **Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, lab contacts, lab hours, etc.)** |



# Section 8.
# Effective Communication

Effective communications is a key element of emergency response. Make sure you have a well thought out communications strategy in place as part of your emergency response plan. If you haven't planned ahead by the time a crisis hits, it's too late. How you communicate with your employees, customers, and the media can affect the outcome of the situation.

Developing partnerships with others in your local emergency response network, establishing relationships with your customers and the media, and creating communication tools such as fact sheets and media releases ahead of time will help you communicate efficiently and successfully during a crisis. For example, establish positive media relations before an emergency. Make an effort to meet with reporters in your local area to share information about your water system and how they could receive information should an emergency occur. Also contact your local emergency response organization if one exists and determine what assistance they can provide during an emergency.

During an emergency, the media, your customers, and others will have many questions. Be prepared by organizing basic facts about the crisis and your water system. Assemble a team of players quickly, including a main spokesperson and one or more people to answer customer calls.

Expect your customers to be concerned or upset during a drinking water emergency. How you communicate with people is as important as the content of the information you are delivering. Body language, tone of voice, and expressions of sympathy all play an important role in how the information is received. When an emergency occurs, the news media may be on-scene quickly, requesting information that will inevitably go to the public. Appoint a spokesperson to communicate to the media. Make sure the spokesperson is credible, accessible, in a position of authority, and trained in media interview techniques.

Develop key messages to use with the media that are clear, brief, and accurate. Make sure your messages are carefully planned and have been coordinated with local and state officials. If your messages are different you'll want to know that and be prepared to explain why.

Make sure field and office staff know how to deal with the media and questions from customers and the public. It may be necessary to establish protocols for both field and office staff to respectfully defer questions to the spokesperson.

Small water systems that have limited staff should remember that the DPH Drinking Water Divsion office and the DPH Commissioner's Office of Health Communication are available to assist in developing and communicating messages to the media and the public. This can be especially helpful when staff need to focus on sampling or repairs.

**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 concerns of customers.
- 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.
- Etc.

**Health Advisories**

During events when water quality and public health are in question, it may be necessary 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. These advisories are issued when the health risks to the consumers are sufficient, in the estimation of the water system or state or local health officials, to warrant such advice.

Health advisories usually take the form of a drinking water warning or boil water advisory. Communication during these times is critical. DPH Drinking Water Division staff are committed to working closely with water systems to determine if an advisory is needed. Health advisories should always be well thought out and provide very clear messages.

Health advisories can be challenging and time consuming for the water system and public health partners. They are also inconvenient for water system customers. However, these advisories are necessary in order to protect public health. In determining whether to issue a health advisory, there are many things to consider and questions to answer, usually in a short time period. This is another important reason that water systems should form partnerships in advance of these events. If there are well-formed partnerships, it will be much easier to obtain information, make decisions, and get the information out to the public. DPH has put together forms and a template to help water systems be prepared to issue a health advisory.

# Section 9.
# The Vulnerability Assessment

It is essential that water systems 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 hurricanes, floods, other natural events, and vandalism is common. Community water systems serving populations greater than 3,300 persons are now being required by the Environmental Protection Agency to identify vulnerabilities to intentional acts of terrorism. This document uses the term vulnerability assessment to mean the process by which the water system evaluates 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, the water system must estimate how the system and its facilities may be affected in emergency situations. Another integral part of the vulnerability analysis is to assess facilities for security enhancements that may guard against unauthorized entry, vandalism, or terrorism. This overall effort forms the basis for determining what preventive actions or improvements are needed and identifying response actions to take in the event of an emergency.

A vulnerability assessment is essentially a four-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 of various types of emergencies (hurricane, vandalism, etc.) on the components. You may also want to assess the impact on the system's 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 that can be made and mitigating actions the system can take to 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. Many questions need to be asked:

- 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. One method is to identify the types of emergencies that are preventable and unpreventable as you assess each component. Preventable causes such as aging equipment, poor maintenance, poor system design, lack of security measures such as fencing and lighting, spare parts, high risk or ill advised land usage near a water sources are all factors that can be managed to prevent water system emergencies. Make sure to consider the land usage near your water sources when you describe your vulnerable areas. Contaminant sources such as septic tanks near your water sources may be managed through source protection measures. For example, relocating a septic system out of a sanitary radius or relocating livestock away from the source are important activities to consider.

Unpreventable causes are those that are beyond control of the water system. Hurricanes, droughts, floods, vandalism, terrorism, and power outages are a few examples. These events can be anticipated, and some mitigating actions can be taken to lessen the impact. However, every emergency is unique and you can never anticipate everything that may happen. As you complete your assessment, pay particular attention to 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 have focused on vandalism, contamination, and natural disasters. However, after recent terrorist attacks, the idea of what constitutes a threat to drinking water supplies has changed. There is new emphasis on enhancing water system security to guard against vandalism and intentional acts of 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 that can be taken to guard against attack.

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

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

To help small and medium size water systems assess security, the Association of State Drinking Water Administrators and the National Rural Water Association have developed security vulnerability self assessment guides. These self assessments are

designed to help water systems assess their facilities and identify security measures. They can be obtained over the Internet at: http://www.asdwa.org/ or http://www.nrwa.org/

**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 can lessen the impact.

**Example: Facility vulnerability assessment and improvements identification**

| 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 acts of vandalism. | Implement wellhead protection program. | Upgrade well houses: Install fencing, and deadbolts. Secure well houses to foundation and install lighting around well house. |
| **Storage** | Storage reservoirs are in sound condition, but reservoir hatches could be accessed and locks could be broken. | Vandals could access reservoir hatches. Also, the reservoir could be prone to shaking and settling resulting from an earthquake. | Provide earthquake strapping to secure reservoir to the foundation. | Install fencing, lighting, and signage to protect against unauthorized entry and access to reservoir hatches. |
| **Treatment** | There is a chlorination system in each well/pump-house. Both are in sound operating condition. | Chlorination systems are subject to power outages and vandalism if a pump-house is vandalized. Tanks are not secured and may tip over during an earthquake. | Purchase a back-up generator and have it wired in or have system wired with a jack where a back-up generator could be rented and plugged in. Secure tanks with earthquake straps. | Install fencing, lighting, and signage 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 signage to protect against unauthorized entry. |
| **Computer and telemetry system** | Computer and telemetry systems are located in the water systems main office. All systems are in good operating condition. | Main office does not have adequate security measures. Also, computers should be better protected against cyber attack or hacking. | Security software and passwords to prevent unauthorized use/entry of system. | 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 that the system may experience. In any event there are a series of general steps that a water system should take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate actions 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.

Knowing the various elements of emergency response planning and keeping in mind these general steps will help you develop response actions for specific events.

**Establishing response actions for specific events**

There are numerous events which may cause an emergency that are dictated by the system's size, complexity, type of source, and geographic location. As discussed before, likely causes of emergencies in our state that a system should consider are power outages, transmission or distribution line breaks, contamination of cross connection, chlorine treatment failure, surface water treatment malfunction, source pump failures, microbial (coliform, E. coli) contamination, chemical contamination, acts of terrorism, vandalism, loss of water in the well, drought, floods, ice storms, hurricanes, and hazardous spills in the vicinity of sources or distribution lines. In any of these situations your priority is the protection of people using the water. Be observant of what is going on around you, and if you suspect vandalism or terrorism, contact local law enforcement and make every effort to preserve evidence.

These are only starting points, since each system is unique and may encounter additional situations that are important to be prepared for. Use partnerships to assist in this effort. The following table presents a way to identify an event, summarize the assessment, set forth immediate response actions, define what notifications need to be made, 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 has a connection so that a generator can be rented and plugged into the system. Most of the time, storage is able to supply the system for several hours until power is restored. |
| **Immediate actions** | 1. Assess whether the outage is likely to last more than 6 hours. If no, be on alert for changing conditions and monitor storage tanks. If yes, complete the following steps:<br>2. Call on availability of back-up generator at JJ's Rentals.<br>3. Obtain generator if available.<br>4. Connect generator to system and resume operations.<br>5. Implement water shortage response actions to inform customers to cut back on water usage until power is restored. |
| **Notifications** | 1. Power Company – Let them know that a public water system is experiencing an outage and the generator will be turned on until power is restored.<br>2. JJ's Rentals – Obtain generator<br>3. Customers – cut back on water usage until power is restored. |
| **Follow-up actions** | 1. Turn off and disconnect back-up generator<br>2. Return system to general power supply<br>3. Inspect reservoirs and pumping facilities to ensure proper operation.<br>4. Return generator to JJ's. |

# Section 11.
# Alternative Water Sources

Water contamination or disruption of supply may require that the water system get water from an alternative source to meet basic community needs. All public water systems should plan ahead to provide alternate safe water during an emergency, if feasible. It is important to evaluate potential alternative water supplies ahead of time to ensure the water is safe and the supply is available.

Sources that the water system may use when the primary and seasonal sources cannot meet demands are defined as "emergency sources." They are used only when required by extreme, and mostly unpredictable, circumstances. Alternative sources might include emergency or back-up wells, surface water sources, or springs. A water system that anticipates use of an emergency source should plan and take action well in advance of any need. As part of the emergency response planning, the water system should test these sources and work with the DPH Drinking Water Division to obtain approval as an emergency source.

Another important consideration is whether the water system can establish an interconnection 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: Interconnection to adjacent water supply system**

| Water systems within one-quarter mile of our system | Feasibility of connecting |
|---|---|
| There is one water system located within one-quarter mile of the XYZ water system. The XYZ distribution system is within 1000 feet of the other water system. | The system has discussed installing an interconnection with the adjacent water supply. The system is willing, but at this time cannot assist financially. The cost of the project is about $10,000 to install pipe and an interconnection. Unless the other system can assist financially it is not feasible for the XYZ system to construct the interconnection until 2006. |

**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 1000 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 | 5000 gallons in less than 6 hours | No |

# Section 12.
# Curtailing Water Use

An emergency may require reducing 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 of signs in visible community areas, and contacting the news media. Curtailment messages should be pre-scripted to ensure proper messages are delivered.

**Example: Curtailing water use**

| Water curtailment measures | Actions |
|---|---|
| Restrict outside water usage including watering lawns, washing cars, etc. Request curtailment of inside usage. | • Upon making the decision that curtailment is needed:<br>• Draft door hanger with curtailment messages.<br>• Post on customer doors.<br>• Contact KYGO AM news to announce curtailment message.<br>• Monitor system usage and spot check meter usage if time is available.<br>• Continue message as long as curtailment is warranted. |

# Section 13.
# Returning to Normal Operations

As the emergency passes and you regain control, the system must prepare to return to normal operating condition. This may be a very simple or very complex process, depending on the type and severity of the emergency. Returning to normal operation may simply mean the system restores power and the back-up generator is disconnected. Or it could mean the system has to obtain the proper number of satisfactory coliform tests and disinfect the system in order to lift a health advisory.

Many factors might need to be considered before you decide to return to normal operation. For example:

- Has the system been repaired to the point that it can meet demand?
- Has the system operator made a safety and operational inspection of all system components?
- Has the system been properly flushed, disinfected and pressure tested?
- Has the water been adequately tested in accordance with 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 the follow-up actions and staff responsibilities that 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 inspect all system facilities, ensure all water quality tests have been done and the system has been flushed and disinfected if necessary. Water system operator makes a report to the water system manager. Water system manager makes decision on current condition of system. |
| Verification of water quality | Water system manager verifies water quality sampling results. |
| Coordinate with DPH Drinking Water Division | Water system manager coordinates with DPH 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 public notice. |

# Section 14.
# Training and Rehearsals

**Training**

Emergency response training is essential. Training educates system personnel about emergency situations and resulting effects on water systems and also provides an opportunity to practice responses. Any training should have a purpose, appropriately selected personnel, and qualified instruction and supporting materials.

Training can be conducted in a variety of ways, including attending training classes or bringing in experienced trainers for on-site training and exercises. On-site exercises with experienced trainers are very useful, as they involve activities that are specific to the 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 or how to communicate with the media and customers during an emergency.

When planning 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 that they don't use very often. It also provides 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 as a result of a specific event.

**Example: Training**

Identify staff position 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, sometimes referred to as "table-top exercises" are valuable tools to make sure employees are always prepared to respond. Ideally, rehearsals are set up by the water system manager and are unannounced to employees. During these rehearsals, employees are required to conduct actual responses. They make phone or

radio calls, perform inspections, respond to inquires, and do other tasks. Get assistance from partners such as local health jurisdictions and local emergency response people.

Practicing for an emergency is the only real way to thoroughly evaluate the 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, i.e, communications, water line breaks, sampling with a professional trainer | Water system staff and professional trainer | May 2003 |

# Section 15.
# Plan Approval

Representatives of the water system who are ultimately responsible, such as water system manager, owner, board members, commissioners and council members, should review, approve, and sign the water supply emergency contigency plan. This demonstrates support for the plan, acknowledges the effort put into its preparation, and puts it officially into effect.

**Example: Plan approval**

This plan is officially in effect when reviewed, approved, and signed by the following people:

| Name/Title | Signature | Date |
|---|---|---|
| Marsha Ready<br>Water System Manager | *Marsha Ready* | March 1, 2003 |
| Bob Jones<br>Chairman<br>Water Commissioners | *Bob Jones* | March 1, 2003 |

# Part 2: Planning Template

## Introduction

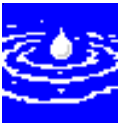
Preparing an emergency response plan is an essential part of managing a drinking water system. The Department of Public Health (DPH) has made this template available to all public water systems in the state to help them develop such plans.

## 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 provides examples of how you might present information in your plan. Use Part 1 as a tool to learn about emergency planning and then fill out the template provided here 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.

An electronic copy of the template is available, and allows you to easily fill in the blanks using a computer if you wish. To obtain the template you can visit the DPH Drinking Water Division web site at http://www.dph.state.ct.us/BRS/Water/Publicdrinking/pws.htm



# 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/Town** | | |
| **Population served and service connections.** | _____ people | _____ connections |
| **System owner (the owner should be listed)** | | |
| **Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.** | | _____ Phone<br>_____ Cell<br>_____ Pager |

# Section 3.
# Chain of Command - 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 – lines of authority**

| Name and title | Responsibilities during an emergency | Contact numbers |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

# Section 4.
# Events that Cause Emergencies

The events listed below may cause water system emergencies. They are arranged from highest to lowest probable risk.

**Events that cause emergencies**

| Type of event | Probability or risk (High-Med-Low) | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# Section 5.
# Severity of Emergencies

Decisions on severity should be collaborative among system personnel, but are ultimately made by the person in charge of the emergency. The information for making such a decision will accumulate over time, and may result in changes in the assessment of severity.

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

**Level I –** _____ (Definition)

| **Description:** |
|---|
| |

**Level II –** _____ (Definition)

| **Description:** |
|---|
| |

**Level III –** _____ (Definition)

| **Description:** |
|---|
| |

**Level IV –** _____ (Definition)

| **Description:** |
|---|
| |

**Level V –** _____ (Definition)

| **Description:** |
|---|
| |

# Section 6.
# Emergency Notification

**Notification call-up lists**

Use these lists to notifying important parties during of an emergency.

**Local notification list**

| DAYTIME | NIGHT/AFTER HOURS |
|---|---|
| Local Law Enforcement | Local Law Enforcement |
| Fire Dept | Fire Dept |
| Ambulance service | Ambulance service |
| Local Health Jurisdiction | Local Health Jurisdiction |
| Water Testing Laboratory | Water Testing Laboratory |
| Local emergency management | Local emergency management |
| Water System Operator | Water System Operator |
| Neighboring Water System | Neighboring Water System |
| Neighboring Water System | Neighboring Water System |
| News Media Contact | Local Radio Station |
| Other | Other |

## State notification list

| DAYTIME | NIGHT/AFTER HOURS |
|---|---|
| State Police<br><br>DPH Drinking Water Division | State Police<br><br>DPH Drinking Water Division |
| State testing laboratory | State testing laboratory |
| Other | Other |

### Service/repair notification list

| DAYTIME | NIGHT/AFTER HOURS |
|---|---|
| Electrician | Electrician |
| Electric Utility | Electric Utility |
| Plumber | Plumber |
| Pump Specialist | Pump Specialist |
| Soil Excavator | Soil Excavator |
| Equipment Rental | Equipment Rental |
| Other | Other |
| Other | Other |

### Notification procedures

### Notifying water system customers

| | |
|---|---|
| **Who is Responsible:** | |
| **Procedures:** | |

### Alerting local law enforcement, state drinking water officials, and local health

| | |
|---|---|
| **Who is Responsible:** | |
| **Procedures:** | |

**Contacting 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 contamination is suspected, notify and work with the DPH, Drinking Water Division office to help identify what testing should be done. This may help prevent illness or even death.

**Water quality sampling**

| Sampling parameter | Basic steps to conduct sampling (sites, frequency, procedures, lab requirements, lab locations, contacts, etc.) |
|---|---|
| Coliform Bacteria | |
| Hetertrophic Plate Count (HPC) | |
| Chlorine Residual | |
| Chlorine Demand | |
| Nitrate/Nitrite | |
| Total Organic Carbon (TOC) | |
| Total Halogenated Organic Carbon (TOX) | |
| Cyanide | |

# Section 8.
# Effective Communication

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

### Designated public spokesperson

Designate a spokesperson (and alternates) for delivering 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**

During events when water quality and human health are in question, it may be necessary to issue a health advisory that gives advice or recommendations to water system customers on how to protect their health when drinking water is considered unsafe. These advisories are issued when the health risks to the consumers are sufficient, in the estimation of the water system or state or local health officials, to warrant such advice.

Health advisories usually 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.

# 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 consider-ations | | | | |

# 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 actions 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.

The following tables identify the assessment, set forth immediate response actions, define what notifications need to be made, 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

| | |
|---|---|
| **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 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. Hurricane

| | |
|---|---|
| **Assessment** | |
| **Immediate actions** | |
| **Notifications** | |
| **Follow-up actions** | |

## N. Hazardous materials spill in the vicinity of source or system

| | |
|---|---|
| **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. Cross Connection

| | |
|---|---|
| **Assessment** | |
| **Immediate actions** | |
| **Notifications** | |
| **Follow-up actions** | |

## R. Other

| | |
|---|---|
| **Assessment** | |
| **Immediate actions** | |
| **Notifications** | |
| **Follow-up actions** | |

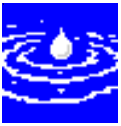
# Section 11.
# Alternative Water Sources

**Interconnect to adjacent water supply system**

| Water systems within the vicinity | Feasibility of connecting |
|---|---|
| | |
| | |
| | |
| | |

**Alternate source(s) of water**

| Alternate sources | Name | Phone | Availability | Is the water safe for drinking? |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



# Section 12.
# Curtailing Water Usage

**Curtailing water use**

| Water curtailment measures | Actions |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

# Section 13.
# Returning to Normal Operations

**Returning to normal operations**

| Action | Description and actions |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# Section 14.
# Training and Rehearsals

**Training**

Identify staff position 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 officially in effect when reviewed, approved, and signed by the following people:

| Name/Title | Signature | Date |
|---|---|---|
| | | |
| | | |
| | | |

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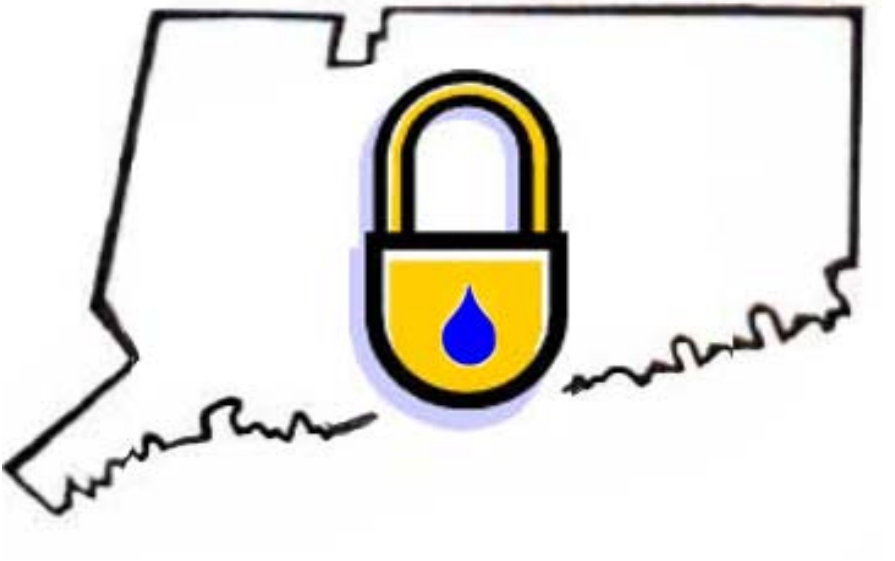
The Connecticut Department of Public Health
welcomes comments and suggestions concerning this planning guide book.



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Be Water Smart...Be Water Wise!