5 Step 5: Developing a Contingency Plan

Introduction: what this step is about

The best way to make sure that your community continues to receive potable water is to anticipate possible problems with a **contingency plan** – a set of procedures prepared in advance to respond to contamination or disruption of the water supply.

In other words:
BE PREPARED.

The main goal of your wellhead protection (WHP) program is to protect your community's drinking water supply by preventing the contamination of its ground-water source. Unfortunately, even with the best plans and programs in place, occasional disruptions in supply can still occur. More than 6,000 incidents of ground-water contamination had been reported in North Carolina by the end of 2001, occurring in every county in the state[1]. Leaking underground storage tanks, accidental spills, power outages, vandalism, and natural disasters are familiar events and they could occur in your wellhead protection area (WHPA). The most effective way to make sure that your community continues to receive potable water is to be prepared for such events with a **contingency plan**.

A contingency plan is a set of procedures prepared in advance to respond to contamination or disruption of the water supply. A good contingency plan is tailored to your particular situation and addresses the potential contaminant sources identified in Step 3. By anticipating problems and planning for them, your community can rapidly mobilize the technical, financial, and administrative resources needed to keep a spill from entering the distribution system or to get a new water supply developed. To respond effectively to emergencies, procedures must already be in place when threats occur.

The process you will follow to develop a contingency plan will require you to: 1) carefully assess the physical components of your supply system, some of which are documented in Step 2; 2) identify the most likely causes of supply disruption, including the Potential Contaminant Sources (PCSs) identified in Step 3; and 3) coordinate and establish broad support from emergency responders and the community.

By anticipating problems, the community can rapidly mobilize the technical, financial, and administrative resources needed to keep a spill from entering the distribution system or to get a new water supply up and running.

[1]Pollution Incident Reporting Form (PIRF) Database

Procedure: what you need to do to complete Step 5 toward your WHP plan

You must include plans for both short-term contingencies (for example, power loss, line breaks, mechanical failures, or other emergency situations that would last less than 48 hours) and long-term contingencies (for example, drought or contamination of extended duration when an alternate supply will be needed). As you work through each phase of the contingency planning process, consider short- and long-term effects at each point.

Key considerations in developing your contingency plan are:

- Water system features, including supply, treatment, and distribution components;
- Principal contamination threats, including both stationary PCSs and mobile sources like rail cars and tank trucks;
- Supply disruption threats, such as power loss, line breaks, or mechanical failures;
- Water supply alternatives, including supplies within and outside the existing system, water conservation, additional water treatment, or aquifer remediation;
- Available logistical and financial resources; and
- Response agencies and personnel, both local and state.

Contingency planning helps you answer questions like:

- What are the likely threats to community water supplies?
- What steps must be taken to respond to those threats?
- Who is responsible for each step in the response plan?
- How can response actions be coordinated?
- Where can replacement water supplies be obtained?
- Where can technical and financial resources be obtained?

Developing a contingency plan can be done in a series of steps. First, set some priorities based on knowledge of the principal water system, possible disruptions (contamination or other), and community needs, both short-term and long-term. Second, determine what procedures will be necessary to respond to the most serious threats. Third, inventory the resources available to you, including services, expertise, funding, and equipment, and determine if additional resources are needed. Finally, define procedures and responsibilities to determine who will do what in an emergency.

Set priorities

Steps in developing a contingency plan:

- Set priorities based on likelihood and severity of possible disruptions
- Determine what procedures will be necessary to respond to disruptions
- Inventory available resources
- Define procedures and responsibilities for emergency response

Start with the PCS inventory from Step 3, then add to the list other sources of contamination or disruption, such as rail car spills, truck accidents, power outages, vandalism, etc. Make judgments about probabilities of these threats occurring, and the severity of disruption caused, then rank risks and set priorities accordingly (See Table 1). Setting priorities allows the greatest threats to receive your most urgent attention.

Regardless of how you set your priorities, your first objective should be to protect the health of those who drink the water. The next priority is to minimize the contamination of your ground-water supply, because remediating or replacing your water supply would be a major challenge.

Table 1. Example of Emergency Prioritization Table

Type of Emergency	Probability* (1)	Severity* (2)	Risk** (1)*(2)	Remarks
Natural				
Drought	7	5	35	Severity can vary; lessened by availability of alternate sources
Flood	7	5	35	Especially pump station #2
Ice/Snow Storm	5	1	5	
Hurricane	1	1	1	
Human-caused				
Fire	1	4	4	
Explosion	5	5	25	
Vandalism	5	10	50	Currently a problem
Power Failure	8	3	24	
Rupture/Leak	4	5	20	Higher likelihood in old sectors
Contamination* **				
Train derailment	3	10	30	Along old C&O line near Hwy. 61
Tank truck accident	5	8	40	Centered on I-85

* 1–lowest, 10–highest
** 1–lowest, 100–highest
*** PCSs identified in Step 3 added as appropriate

Identify response procedure needs

Before you can identify resources or establish emergency procedures, you may need to gather more information about the nature of the problems that could be caused by a given PCS or water supply disruption. For example, different sources of chemical contamination may require specific methods of neutralization or containment. Learn what responses are appropriate for each PCS that could require an emergency response. One source of information is the Material Safety Data Sheet (MSDS) that lists safety hazards and emergency concerns for each chemical that a business uses. Copies of MSDS must be available at the place of business and can be obtained from chemical vendors. Other sources of information are included in Step 3.

Learn what control measures would be required at each PCS to keep an accidental spill from entering ground water. If a major highway or rail line passes through your WHPA, numerous contaminants could potentially be spilled by an overturned truck or train accident. Trucks containing hazardous materials must display a placard that provides certain information about the contents. (A pair of binoculars for reading the truck's placard without entering the spill area can be an important asset.) Some shippers place a code number on the placard that corresponds to the record of the hazardous material and subscribe to a telephone service that can provide complete information to emergency responders. This phone number should be included with other contact numbers. It may be worthwhile to learn about materials that are routinely shipped through your WHPA so that you can be prepared for emergencies. Knowledge of local and regional industry and observations made by local residents can be useful in gathering such information.

In identifying possible response procedures, you may find that a particular PCS requires a response that is especially costly, labor-intensive, or technically challenging. This information will be important later, when deciding whether additional resources will be needed to prepare for threats to your water supply.

Identify resources

A key purpose of a contingency plan is to ensure that the proper personnel, equipment, technical, and financial resources will be available when needed. The contingency plan should enable local officials and water system managers to rapidly identify and coordinate resources in an actual emergency. Resources to consider in your plan include:

- **Personnel**
  - Existing utility staff
  - Technical assistance: Where is the nearest well drilling firm and what sort of mobilization time can they guarantee? Are there local contractors who would be willing to enter into an agreement to provide emergency services?
  - Response agencies: local (e.g., police, fire, EMS), state, and federal
  - Technical experts from local, state, federal, and private organizations
- **Financial resources**
  - Existing local revenues dedicated for water system maintenance and water supply protection
  - Long-term and emergency financial reserves
  - Financial, equipment, and personnel resources available through existing agreements with neighboring localities, state or federal agencies
  - State and federal grants and funds such as the state UST trust fund, state and federal Superfund programs, and Federal Emergency Management Agency funds
  - Organizations that can provide in-kind (non-monetary) assistance
- **Essential services, equipment and supplies**
  - Water supply alternatives

    Supply from within the system: can other wells or surface sources be brought online, or diverted as needed?

    Supply from outside the system: are cooperative arrangements needed with neighboring public water utilities?
  - Water sampling and analysis equipment and supplies
  - Portable pumps and generators
  - Chemical supplies
  - Treatment equipment
  - Repair facilities and spare parts
  - Alternative distribution equipment
  - Vehicles and equipment for emergency evacuation and transportation
  - Personnel protection equipment and supplies
  - Heavy equipment contractors

A key purpose of your contingency plan is to ensure that the proper personnel, equipment, technical, and financial resources are available to enable local officials to identify and coordinate the response to an actual emergency.

Depending on the size of the water system and whether the system is a private company or a public utility, the required resources may be found in-house or may be available from another branch of local government, an adjoining county or municipality, from a state agency, or the National Guard. Response services and equipment that are identified as essential but cannot be secured at the present time must be highlighted. Contact information for external resources that may be needed in an emergency should be recorded prominently and kept up to date.

Define emergency response procedures

After you have prioritized the potential threats to your water supply, determined any special emergency response needs, and defined the resources necessary to respond to threats or emergencies, the next step is to establish the specific procedures for your emergency response. These response procedures form the core of your contingency plan. The procedures should be carefully thought out and, where possible, tested before you need them.

Identify the primary and backup persons (or positions) responsible for implementing the contingency plan in the event of an emergency

These individuals may not necessarily be the same parties that are responsible for implementing the rest of the WHP plan. They must have experience and knowledge of the local water system, strong management capabilities, a willingness to work with others and seek consensus, and be locally available on short notice. He or she should have the community's respect and be capable of acting with authority. Responsibilities for other aspects of the emergency response should also be carefully matched to the team members' capabilities to insure smooth and effective functioning when it is needed the most.

Establish standard operating procedures (SOPs) for water plant operators

These procedures will include the Emergency Contact Sheet (Attachment 1) and additional instructions for handling emergency situations.

State in the Plan how wells that are contaminated can be isolated from the public water supply system

The Plan should clearly state that if evidence of well contamination exists, the well will be taken off line immediately and not returned to service until it is determined that water quality from the affected well is in compliance with standards governing public water supplies. The plan must state clearly who has the responsibility and authority to declare that a well is actually or potentially contaminated in an emergency.

The Plan should describe the procedure used if contaminated water enters the public water supply system

Describe how the system would be flushed/purged of contamination following such an event. State the criteria (such as sampling and analysis) that would be used to determine when the flushing/purging is successful. Describe how the public will be notified of such events.

The following specific procedures should be addressed in your contingency planning. Coordinate actions with your local emergency planning committee or emergency responders.

- Emergency identification—determination that emergency exists
- Internal communications
  - Information gathering during emergency notification
  - Notification of key personnel
  - Notification roster, beyond initial contact person/ persons
- Incident direction and control
  - Development of a chain of command
  - Identification of individual and agency roles
- Public communications/community relations
  - Advance public information, emergency plans
  - Notification of emergency, including instructions to boil water/not to drink the water until it is determined to be safe
  - Status reports during the emergency
  - Guidelines for citizens to minimize damage
- Contamination assessment and management
  - Identification and isolation of the contamination source
  - Contamination mapping
  - Site response (neutralization of chemical, disinfection, etc.)
  - Response agreements with neighboring communities
- Ongoing incident assessment
  - Status of water system
  - Status of response effort
  - Estimated time of system recovery
- Obtaining alternative supplies
  - Identification of agencies/organizations that will provide short-term emergency water supplies
  - Establishment of plans for long-term alternative supplies
- Water use restrictions
  - Identification of categories of water use restrictions based on severity of disruption
  - Modification or reduction of water use
- Water treatment
- Aquifer remediation

Your plan should include a training agenda and timetable for utility workers and local responders. This training program will be ongoing, as conditions in the WHPA and the techniques for dealing with contamination both change.

Contingency planning should improve your ability to respond when a potential threat becomes a reality. Test the plan to identify any problems that may interfere with its smooth operation. The plan should be reviewed and updated regularly. Specific steps clearly understood by the operators on duty and by the public will allow problems to get the prompt attention necessary to minimize their impact.

Involving the public

Bring in emergency personnel to discuss options, if they are not already members of the planning team.

The contingency plan must reflect public concerns about their water supply and must tell residents how they will get information about an actual emergency.

Present possible emergency plans for public input. Without support at the local level, response to a real threat can be slow and cumbersome. Coordination can be as important as access to technical assistance when it comes to developing the team and getting the job done. The public's response may be an indication of the feasibility of your proposed plan. Those who have a part in creating a plan are more likely to cooperate in the event of a real emergency.

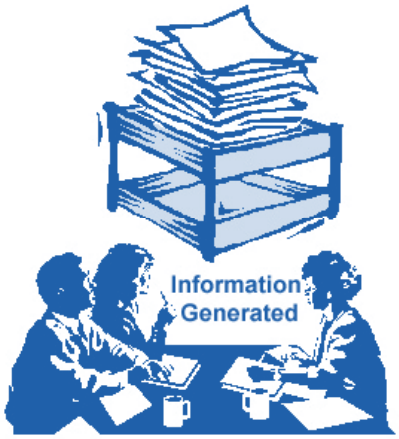
Public meetings may be useful in setting priorities for contingency planning. Town residents may present reasons for ranking threats that differ from those perceived by public officials. Public support will be necessary to make public investment in new equipment or services.

It is critically important to make the public aware of the contingency plans that are produced. Additional public education efforts should be directed toward the public's own part in any emergency response. Residents should know how to report a potential contamination incident, how they will be notified of an emergency, what to do in an emergency, and how to conserve water when the number of wells online is reduced for some reason.

Products that should result from Step 5, to be included with the final plan:

When you've completed this step, you should have the following information to include with the final plan you submit to PWS:

1. Forms and information for emergency contacts;
2. SOP documents for water supply workers;
3. Long-term and short-term response procedures; and
4. Documentation of public citizen participation in developing emergency procedures and plan for publicity and public education on contingency plan.



Resources and References

Guide to Ground-Water Supply Contingency Planning for Local and State Governments: Technical Assistance Document. 1990. EPA 440-6-90-003. Office of Water, Office of Ground Water Protection, U.S. Environmental Protection Agency. Paper, 83 pages; 14

USEPA. 1993. Wellhead Protection: A Guide for Small Communities. EPA/625/R-93/002. Office of Research and Development, Cincinnati, OH.

North Carolina Rural Water Association (NCWRA). Phone: 336-731-6963
http://www.ncrwa.com/

North Carolina Water Supply Plans
http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/
Information on water sources, wells, principal water users and distribution systems for North Carolina communities.

North Carolina Division of Water Resources Water Conservation Information
http://www.dwr.ehnr.state.nc.us/wsas/conserve/wc_main.htm

North Carolina Drought Monitoring Council
http://www.ncwater.org/Water_Supply_Planning/Drought_Monitoring_Council/
Current water supply conditions, outlooks, and list of Public Water Supplies under water use restrictions

Attachments

Beginning with the next page, you will find attachments that are provided to make it easier for you to prepare your plan document.

Remember, the attachments labeled “Example” are only to give you ideas.

- **Attachment 1: Forms for emergency contacts**
- **Attachment 2: Example Contingency Plan**

Attachment 1 (example): Emergency contact information

In the event of an emergency, the Operator in Charge will immediately notify emergency personnel, beginning with the top name on the emergency contact list below. The Operator in Charge will continue down the list until an appropriate person is contacted. Those people named on the emergency contact list each have a list of additional emergency numbers to call. They will confirm the nature of the event, and direct the Operator in Charge in additional actions.

Emergency Contact Numbers

Director of Public Works _____
- Office _____
- Home _____
- Pager _____

Water Plant Superintendent _____
- Office _____
- Home _____
- Pager _____

Town Manager_____
- Office _____
- Home _____
- Pager _____

Fire and rescue chief _____
- Office _____
- Home _____
- Pager _____

County emergency coordinator_____
- Office _____
- Home _____
- Pager _____

Building Inspector _____
- Office _____
- Home _____
- Pager _____

Additional Operators _____
- Office _____
- Home _____
- Pager _____

Other numbers:

- Railroad emergency number _____
- DOT emergency number _____
- Regional PWS office _____
- Local National Guard office _____

Attachment 2: Example of a contingency plan resulting from this step

Physical Components of the Clearwater Water Supply

The Wellhead Protection Areas around the three municipal wells have been delineated and characterized during the development of Clearwater's Wellhead Protection Plan. The facilities of the water system – including the wells, pumps, storage tanks, distribution system, and buildings – are fully documented in the Water Department and Department of Public Works. System specifications are updated annually or whenever major changes or upgrades are made.

Potential Disruptions to the Clearwater Water Supply

The top-priority contingencies identified during the wellhead protection process were chemical spills from tank truck accidents in the vicinity of Well #1 and vandalism around Well #3, which is a current ongoing problem. Because of their relatively high probability of occurrence, both drought and flood are also considered high priority disruptions.

Response Procedure Needs

Materials Safety Data Sheets (MSDS) for all chemicals known to be used or stored by businesses within the WHPA (see Step 3, PCA Inventory) are on file at the Clearwater Fire Department and in the office of the Director of Public Works. The WHP Planning Team has contacted the two companies that routinely ship hazardous materials through the town and has arranged for MSDS to be provided and updated semi-annually for all materials shipped through the WHPA.

The planning team is working with the Clearwater Police Department and the State Patrol to address the concerns over vandalism at Well #3.

There is little that the town of Clearwater can do to reduce the likelihood of flood or drought. Water Department personnel have procedures and information in place to notify residents of water shortages and to provide information on water use restrictions and water conservation measures.

Identify Resources

The Clearwater Director of Public Works is the primary person responsible for implementing the contingency plan. The Clearwater Town Manager will be the back-up person responsible for implementation.

The Director of Public Works maintains a list of well-drilling firms and other contractors that can respond promptly to a disruption of water supply. The Department of Public Works maintains an inventory of portable pumps and generators, repair facilities and spare parts, vehicles and equipment, personnel protection equipment and supplies, chemical supplies, and water sampling gear that can be rapidly deployed in the event of an emergency.

In the event of a power failure, a back-up diesel generator is available for Well # 1. There is no emergency power for the other two wells, but National Guard generators would be requested and used until power is restored. Application has been made with Emergency Management for two mobile generators to reduce dependence on National Guard generators. An on-site generator is available at the Water Plant to pump water from a well to the aboveground storage tanks.

In the event of a loss of local water supply due to drought, flood, or contamination, water can be purchased from the surrounding county, which is tied into Clearwater's distribution system. National Guard tankers could also bring potable water to central locations. Water conservation plans and use restrictions are in place.

Define Emergency Response Procedures

Should a major oil or chemical spill or discharge occur within the Wellhead Protection Area, appropriate emergency agencies will be notified. The Operator in Charge at the Clearwater Water Treatment Plant is in the primary position to minimize the impact should an emergency arise. Therefore, an emergency contact sheet (attached) is posted in a prominent location at the treatment plant. The first to be notified would include the Director of Public Works, who would in turn contact the Clearwater Fire Department, the County Emergency Coordinator, and others on the contact list.

EMERGENCY PHONE NUMBERS
Clearwater Fire Department 911 or 555-1212
County Emergency Coordinator 555-1111

The regional office of the Public Water Supply Section would also be notified of the situation and asked for assistance. In the event of a spill or discharge in the WHPA that had not reached the well, the Groundwater Section of NC-DENR will be notified and asked for assistance in monitoring movement of the contaminant.

Standard Operating Procedures (SOPs) are being drafted for water treatment plant operators to guide their initial response to an incident. These SOPs will address emergency contact and notification procedures and instructions for shutting off portions of the water system to isolate contamination.

The Director of Public Works has the responsibility and authority to declare that a well is contaminated. If any of Clearwater's wells becomes contaminated, or if a potentially contaminating spill occurs within the WHPA, the well will immediately be isolated by closing a valve at the well site. This valve will be chained and locked to protect the water system. If Wells #2 or 3 were to be affected, both wells will be assumed to be contaminated because of their close proximity; and both wells will be taken off line. The well (or wells) will not be returned to service until it has been determined that water quality from any impacted well is in compliance with drinking water standards. Samples will be taken from numerous locations throughout the system, and tested to determine the extent of contamination.

If only a portion of the system is affected, that portion will be isolated from the rest of the system by closing valves around the contaminated section. The affected portion, or the entire system if necessary, will be systematically flushed until sample results show that the contaminant is no longer present and the water meets drinking water standards. In the case of sewage or similar biological contamination, the well and distribution system will be disinfected according to PWS Section guidelines. Depending upon the type of contaminant involved, the flush water can be collected in tankers and disposed of as per State requirements, if needed. After consultation with the Public Water Supply Section, notification that the water supply is safe to drink will be made to the citizens of Clearwater.

If contamination has occurred, water system customers will be notified by Police and Fire Depart-

ment personnel using loud speakers and by local radio and television broadcasts. If a water shortage occurs for any reason, Water Department personnel will go door-to-door, notifying residents of the problem, and providing information on water use restrictions and water conservation measures. Public service announcements will also be placed in the local media.

Over the short term, there is enough water in the storage tanks (when full) for three days normal water demand. If the wells could not be restored to use, other areas outside the likely area of contamination will be considered to drill new wells for long-term water supply purposes. In the meantime, water could be purchased from the surrounding county, which is tied into Clearwater's distribution system. National Guard tankers could also bring potable water to central locations. Brochures and public service announcements on water conservation would be disseminated throughout the community. Consumers with special needs, such as medical facilities, are being identified and their emergency needs defined, to be sure these needs can be met.

Training for chemical spill response has been added to the Fire Department's ongoing training programs. Additional funding is being pursued to allow the purchase of chemical containment supplies for use by emergency responders. Another emergency planning priority is a security system being installed around well 3, not only to reduce the likelihood of vandalism but also to allow a faster response time by public safety personnel.

The Emergency Management Plan, prepared when the Water Supply Management Plan was submitted, (under Title 15A Subchapter 18C of the North Carolina Administrative Code, section .0307) has been updated to include new information and procedures arising from the wellhead protection planning process.