Chapter 10: Emergency Response Planning

Every public water supply system, whether in a remote area or within a metropolitan development, must be secured against intentional vandalism or accidental contamination and each should have an emergency response plan. Systems serving populations greater than 3300 must have and certify to the EPA that a Vulnerability Assessment and Emergency Response Plan have been completed. Think for a moment about how customers would react if there was no water in the house for 24 hours—or for several days! How would users shower, dispose of waste, or cook? An emergency response plan is needed for a number of reasons, but mainly so that when an emergency strikes, it can be handled quickly, efficiently, and professionally; avoiding lawsuits, minimizing damage to the water system and private property, and above all, to assist in protecting public health.

Planning for an emergency is crucial because water systems are critical infrastructures for their communities. It is never a wasted effort. Remember the flood of 1997 in Grand Forks, North Dakota or the Cedar River flood in Iowa of 2008? The 2005 hurricane season with Katrina and Rita rendered hundreds of public water systems non-functioning. Many were placed on a boil order for weeks to months. Washington State in late 2007 experienced a weather situation that caused extensive wind and flood damage to about 21 public water systems. Think how vulnerable small water systems are to any number of emergency scenarios, both natural and man-made. Now is the time to plan for an emergency — whether it is caused by a natural disaster such as an earthquake, flood, tornado, or wild fire, or as the result of criminal activity, a break in the main feed line to the distribution system, or pump failure in the well.

The best person to develop an emergency response plan for a water system is the operator because that individual probably knows the system better than any other person. However, emergency response plans should not be written by only one individual or entity. There are plenty of resources to draw upon and a successful plan will cross the lines of several different departments, including security, law enforcement, management, utility, suppliers and emergency response agencies. This chapter describes the process of putting a plan together. The information presented here is very brief. More comprehensive guidelines and assistance tools can be obtained by contacting MTDEQ PWS, Midwest Assistance, Montana Rural Water, and EPA.

Any emergency response plan should be written down and stored in a binder so it can be changed as new information becomes available. More than one person should be familiar with the plan and know where to find the written document when disaster strikes. A brief emergency response plan can be developed by simply using each of the major topics listed in this chapter and answering some of the questions posed below. Preparing good maps and developing a list of phone numbers is the most critical and should be addressed first. Once the basics have been assembled, then more information and coordination with other agencies can be added as time permits. Taking some time to investigate and assemble this information now can make the handling of an emergency much more successful.

Once a plan is developed, it is critical that it be shared, practiced and that personnel are cross-trained in several aspects of the plan to be able to respond if a critical participant is unavailable when an emergency occurs. Practice the plans through table top and full scale exercises. Ask your county emergency coordinator how to get involved in your Local Emergency Planning Committees (LEPC) and participate in other planned exercises which help build partnerships and networking.

10.1 Identification of Possible Disruption Threats and Vulnerabilities

What kinds of emergencies could happen that would disrupt or stop the flow of water in a public water supply system or would make the water unsafe to drink? Thinking about this question can make it easier to identify a given system's vulnerabilities. Completing a chart similar to Figure 10.1 "Potential Effects of Emergencies on a Water System" can also be helpful. There are certainly many more situations and effects to consider than are listed in this example. Section 11.9 elaborates more on emergency contact agencies and phone numbers which are helpful to have as a handy reference. It is also a good idea to have emergency contact information (contact

names and numbers) for some of your most critical customers including hospitals, medical centers, large industries, military facilities, schools and large daycare centers.

EXAMPLE

Potential Effects of Emergencies on a Water System						
Emergency Incident	Well Contaminated	Well out of Service	Storage Tank Damage	Broken Mains	System Contamination	Power Outages
Vandalism/Criminal activity	X	X	X		X	X
Earthquake	X	X	X	X	X	X
Flood	X	X			X	X
Chemical Spill/ Gas Release	X	X			X	X
Storm Event		X	X	X	X	X
Fire		X	X		X	X
Extreme Temperatures		X	X	X	X	X
Power Outage		X			X	X
Pandemic Flu		X			X	

A well pump could go out during a lightning storm or at any time due to old age. A main distribution line could break during an earthquake or a long cold snap, or due to weakening from excessive corrosion. Vandals could contaminate a storage tank with soap, dead animals or fecal material. Flood waters could immerse a well and contaminate the water source. The entire electrical control system could be knocked out by a surge of electricity or an ice storm. A truck could spill petroleum or a pesticide near one of the wells. A delivery delay may cause a system to run out of chlorine or other needed water treatment chemicals or equipment. A connection could break as a new chlorine tank is being installed, resulting in chlorine gas escaping to the surrounding neighborhood. Pandemic health illness can significantly effect the ability for the water system to be operated correctly such as if the system has only one operator and he becomes too ill to manage the system as it should be in order to keep the community needs met.

These kinds of situations happen to water systems every year. Each of them should be considered in an Emergency Response Plan to protect the public and return service to normal as soon as possible.

10.2 Source Protection

10.2.1 Radius of Protection

Minimum design standards for water wells require that a minimum 100-foot radius of protection is provided around each wellhead. This protective radius must be controlled by the water system through ownership, easement or landowner agreement. The purpose of the protective radius is to minimize the amount of activity and contamination potential that can occur at the wellhead, and should be a component of any wellhead protection plan, but it is *not* intended to serve as the equivalent of a wellhead protection plan.

If the wellhead is located in an area frequented by livestock, it must be fenced to prevent their access to the wellhead. Livestock access can result in damage to caps, vents and electrical conduit. It also allows waste material from the animals to contaminate the area and increases the risk for source contamination by waste material.

Figure 10.2.1 – Fencing Protection Around a Well

Fencing or another type of barrier is also required if the wellhead is located in an area of vehicle traffic—such as in or near parking areas or roadways. Accidental collision of a vehicle with an unprotected well casing or controls could cause tremendous damage and result in subsequent well abandonment or loss of service. More information on source water protection is included in Chapter 4.

10.2.2 Wellhead Security

All pump houses and well house access points, including all windows and doors, must be locked to prevent unauthorized entry. Locking or securely bolted well caps must also be provided on all exposed wellheads. Frequently, bolts holding well caps in place become corroded and difficult to operate or are missing altogether. These must be replaced to adequately secure the well cap to the casing. If the cap from a wellhead can be removed without using tools, there is potential for well tampering to occur.

Screens on well vents must also be inspected regularly to be sure they are preventing entry of insects and other small debris and that a vandal would not be able to insert any material into the vent hole. Since vents allow air movement into and out of the well casing during drawdown and recovery, any substance placed in or near the vent could potentially be sucked into the well when the pumps are operating.

Barriers such as enclosures, boulders, walls, solid fencing, etc., limit the accessibility and visibility of a facility or location and can assist in the “out of sight, out of mind” theory against criminal activity. Signs that warn against unauthorized access or tampering are also a good idea because tampering with a public water system is a federal offense per US CODE Title 42, Section 300i-1. Each situation and facility will be different and should be addressed as necessary. The Water Infrastructure Security Enhancement (WISE) documents are helpful in developing the proper security measures for the system and DEQ PWS can assist in helping you access those guidance documents.

10.3 Security of Storage Facilities

A contamination incident at a Montana public water supply system occurred when a ground level storage tank was vandalized. The access hatch on top of the reservoir was opened and the reservoir was used as an outhouse. The source of the contamination was discovered when the operator was investigating the cause of fecal coliform contamination detected in routine water samples. The system had just completed an extensive improvement project so the storage tank and most of the distribution system were known to be in good condition.

This example illustrates two factors to consider in securing storage reservoirs. The first is that access to the reservoirs should be controlled through fencing (Figure 10.3) or by an access ladder which can either be locked or removed to prevent unauthorized admittance. The second factor to consider is the actual access into the storage tank. The tank hatch should be a shoe-box style sealing lid and all access portholes including vents should be locked. Pressure tanks or other small storage reservoirs should be equally secured, whether they are located outside or in a building.

FIG 10.3

Vents, overflow piping and emergency drain lines must be routinely inspected to ensure they are in good condition, operating properly, and have no evidence of tampering. Flap valves or screens on the ends of overflow lines are commonly used to prevent such unwanted access of birds, insects, or rodents buy may be difficult to secure. Seek out new secure designs or equipment if necessary.

10.4 Security of System Controls

Exposed electrical control panels are sometimes seen adjacent to wellheads and pumping facilities. The attraction these panels have for vandals and the curious is considerable.
While locking panels are somewhat protective against direct tampering, housing these panels in a locked structure provides greater protection and access control.

Systems that utilize SCADA controls need to be aware of the operational concerns and cyber security issues if they are connected to the internet or if others have unauthorized access. Proper precautions such as firewalls, passwords, and even locked doors should be in place to protect access to these electronic and cyber system components. Visit with your system's information technology folks to make sure these things are in place and compatible.

10.5 Designation of an Emergency Coordinator

Since emergencies tend to be a time of chaos, it is best if the person to be designated "in charge" is decided ahead of time. This could be the operator, the public works director, the mayor, a representative of the county emergency services office, or an outside expert.

Disaster response training should be provided for all personnel who may be involved in an incident or event. Such training should include the FEMA National Incident Management System, the Incident Command System, and other safety/response courses that will assist and protect water system staff. These courses will also help identify and develop the assignment of duties and alternates which need to be in the emergency response plans. Reviewing the emergency response plan with others in periodic training sessions is important. If the disaster affects more than the water system, the public water system coordinator may be working closely with several other coordinators in the command center or emergency operation center who are handling various jobs of repair and cleanup within the community. The local or state emergency services will be assisting with the coordination and recovery of the community's critical infrastructure.

10.6 Equipment and Material Resources

Make a list of the equipment and materials that might be needed in any of the emergencies identified in section 10.1. Then list where they can be found and who to contact. Could any of the listed items be borrowed from

other departments in the community, a nearby community or water system, or is there a local contractor with the necessary equipment? Are memorandums of understanding in place with suppliers or service providers? Is there an agreement with other utilities (gas or electric) to assist in time of emergency? How can staff and other needed personnel be contacted and, in situations of widespread emergency, will their families be taken care of? Are there equipment or materials or spare parts that should be kept on hand? Who may have the correctly sized generator for your system to keep minimal operations going?

It is especially important for small water systems with limited personnel and equipment to prepare a list of available extra help and how to contact them. These may include,
but are not limited to, fire departments, construction and excavation contractors, plumbers, electricians, rental agencies, and neighboring utilities with available material and personnel. Montana has recently, along with most of the country, organized and is facilitating a Water and Wastewater Agency Response Network – MT WARN. WARN is a volunteer mutual aid assistance program that is specialized for water utilities to help other water utilities in their time of need. Please visit www.mtwarn.org for more information and water system emergency response resources in Montana.

Remember in creating your resource list to include labs, fuel suppliers, and equipment and tire repair shops. Also consider the needs of the repair crew if the emergency conditions require long hours. How can food and beverages, changes of clothing, portable toilets, and first aid for minor injuries be provided?

One of the most important items to have on hand is a map of the water system with all valve locations identified. If one does not currently exist, draw a temporary one until a more complete map can be developed.

10.7 Procedures to Shut Down or Isolate Components of the System - Wells, Chemical Treatment Plants, Storage, Pumps

The emergency response plan should contain information on how to shut down and isolate portions of the water system if necessary. Many times, most of the water system can continue in operation while an emergency is addressed on a portion of the system. This requires, as mentioned above, a good set of maps of the system with all valve locations well marked. Access to and function of these valves should be checked during routine maintenance to be certain they can still be located and operated.

Instructions on operation of the system or of a specific component could be posted on the wall of the facilities, so someone else could shut it down in an emergency if the person who normally operates the system is not available.

10.8 Coordination Procedures

The Department of Military Affairs, Disaster and Emergency Services (DES) Division and DEQ assist in coordinating federal, state, and local services during emergencies. The county emergency services coordinator can be contacted to assist in planning how the water system and their office will interact in the event a disaster threatens the water supply.

The DES and the county emergency services coordinator can be very helpful in reviewing an emergency response plan and providing opportunities for those plans to be collaborative and practiced. They also maintain a survey of resources within the area, which will be helpful in locating or identifying equipment to be used during an emergency. In any emergency, it will be necessary to coordinate activities with DES personnel at the state or county level and DEQ personnel. The DEQ Public Water Supply Section should be notified immediately if a situation occurs that may result in contaminated water being served to the public or if the operations of the system are affected. Coordination with many other state and local officials and critical customers may also be necessary depending on the extent of the disaster. DEQ PWS staff can assist water systems during an

emergency event by providing potential solutions for operational or response concerns and by advising on regulatory issues or compliance measures.

10.9 Procedures to Communicate with Water Users

The emergency response plan should contain procedures for letting the water users know if the water is contaminated and where or how they can obtain safe drinking water. Critical customers should be contacted directly. A spokesperson should be identified to handle the information that is to be delivered to the public. This person is often called the Public Information Officer (PIO). This may best be assigned to someone other than the operator in order to free the operator's time for necessary system operations. This person should be trained in public speaking and be coached in what the joint message is to the community. Training courses and material are available for this identified person or persons.

For small systems, how the information would be distributed or broadcast will vary. For systems serving highway rest areas, schools, restaurants, bars, and motels, this may be easily accomplished by posting notice or word of mouth and then shutting down access to the water. For subdivisions, mobile home parks and small communities, the information may have to be spread through use of a sound truck, by telephone calls, or direct distribution to the residents. Radio and TV might be helpful so local stations should be listed in the plan. Another option is the National Weather Service – All Hazard Emergency Message Collection System (HazCollect), previously known as Emergency Alert System (EAS), which allows government officials to broadcast public warnings in specific areas through multiple medias. Information going out to the consumers should include what the situation is, what the estimated time for restoring service might be, if the water is safe to drink, and where, if necessary, are alternate sources of drinking water.

A list of all those who should be notified immediately in case of an emergency should also be developed. This might include critical customers and agencies such as hospitals, schools, large industry, health department, fire department, military facilities, law enforcement, DES, DEQ, utility companies, board members, mayor or manager, contractors, volunteers, other utilities, radio, TV and newspapers, and any other emergency coordinating services in your area.

The table of Important Contacts, located at the end of Chapter 11, can be used as a starting point to accumulate this information. This chart should be the first page in an emergency response plan. Share it with others who may be involved in emergency response.

10.10 Sources of Emergency Water

The plan should provide options for sources of safe drinking water during or following an emergency. Perhaps arrangements can be made to make a temporary connection with a neighboring water system or a tanker of potable water brought in for filling water bottles. Remember that not all tankers haul potable water. Do not use a tanker that has hauled chemicals or other hazardous substances—tankers dedicated for use of hauling potable water are the only ones that can be used. Also, know where your emergency supply is coming from and that it, too, is safe to drink.

FIG 10.10. Emergency Water

10.11 Disinfection and Restoration of Water Service

Once the integrity of the water system has been reestablished all effected components of the water system (source, storage, treatment, and the distribution system) will need to be thoroughly flushed and disinfected. Guidelines for this procedure, including guidelines for the amount of chlorine to be added, should be prepared and inserted into the emergency response plan. Refer to Chapter 6: *Treatment of Groundwater* for this information and related references.

In the plan, describe how to disinfect and decontaminate the system. Identify dead ends that will need to be flushed. Prepare instructions that may need to be given to customers on the system about how to flush taps or to restrict water use for a period of time. Identify who will give the "all clear" signal when the system is back in operation and how it will be given. DEQ PWS can assist with the compliance measures and sampling requirements that need to occur after the system has been contaminated and while adequate service is in the process of being restored.

10.12 Funds

All water system budgets should have a reserve fund for emergencies. However, there may be special procedures and documentation required to make use of these funds and the emergency response plan should explain the process. Also, there are emergency funds available for public water systems from state and federal agencies. Contact your emergency services coordinator and DEQ for information on possible sources of assistance.

10.13 Contracts and Agreements

Formal contracts for potential supplies or assistance may or may not be necessary. However, it would be best to obtain written understandings that include the names and telephone numbers of persons to contact (both during and after working hours). An example list is included in Section 11.9.

The agreement should also include equipment and skills available, rental rates for equipment and wages for various skilled personnel, overhead costs, and liability coverage. Liability coverage for both system staff and potential helpers should be discussed to be sure that all are covered under emergency conditions.

As a MT WARN member, the liability, mutual aid, and resources available are addressed when the system signs the membership agreement and provides the system profile information. For more information, contact DEQ or visit www.mtwarn.org.