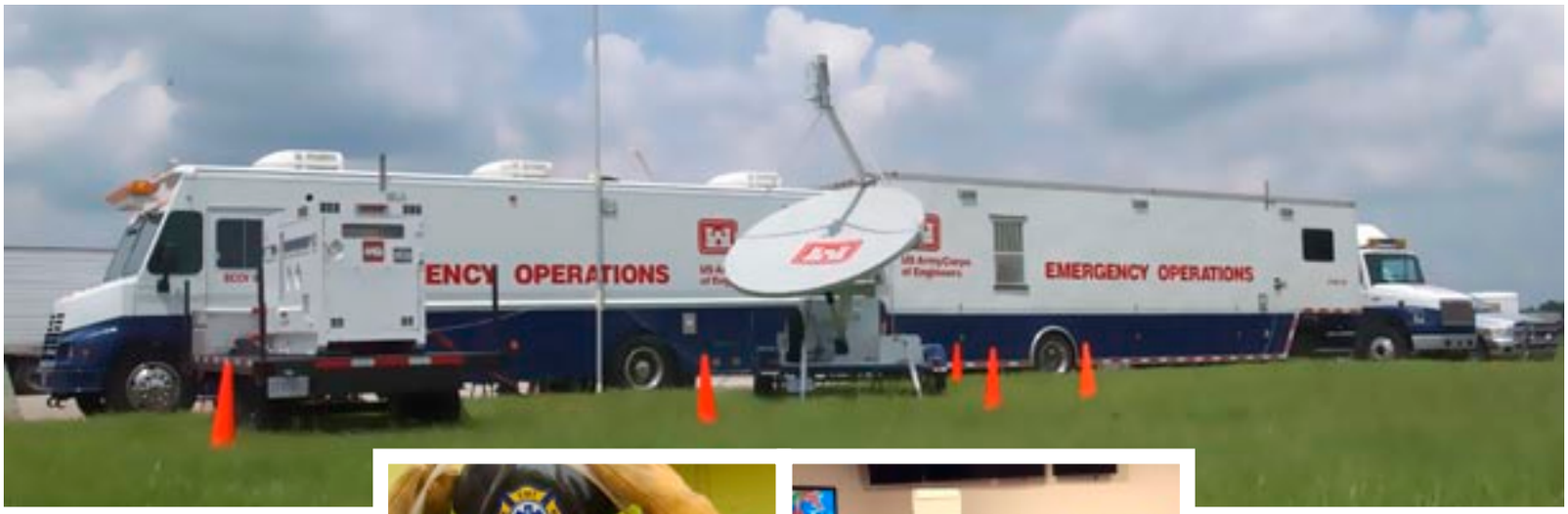

USACHPPM TG 297

Emergency Response Planning for Military Water Systems

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Chapter 1
Water System Emergency Planning: A New Focus

1.1 PURPOSE AND USE OF THIS DOCUMENT

This technical guide (TG) will educate the reader on how to respond to a water system emergency on an Army installation. This document also provides a systematic approach to develop and revise an Army water system emergency response plan (ERP) for external as well as internal installation representatives. All military installations worldwide that either purchase or treat drinking water can use this document to prepare a water system ERP that complies with all Federal and Army requirements. This TG, however, is not a substitute for complying with Federal, State, or Army regulations.

1.2 NEED FOR AN EMERGENCY RESPONSE PLAN.

1.2.1 Summary. In accordance with the 2002 *Public Health Security Preparedness and Response Act*, a drinking water system ERP must be developed for all drinking water systems that serve greater than 3,300 people (reference 1). This requirement was further extended by the Department of Defense (DOD) and Department of the Army (DA) to include all U.S. military water systems that serve greater than 25 persons anywhere in the world (references 2 and 14). Because of the new Federal and military requirements, Army potable water system personnel responsible for regulatory compliance must take action.

1.2.2 Need for Additional Guidance for Army Water Systems. Army Regulation (AR) 420-49, American Water Works Association (AWWA) Manual Number 19, and Technical Bulletin Medical (TB MED) 576 focus on preparation and response for natural disaster-caused emergencies (references 3-5 and 13). New regulations require installations to include responses to terrorist-caused incidents in their water system ERP. As a result, the U.S. Environmental Protection Agency (EPA), other Federal agencies, and water industry organizations have provided guidance; though, only limited guidance specifically applies to Army water supply systems because of their unique operational and management nature (references 6-13). This guide provides the reader specific insight and recommendations for developing an Army water system ERP.

1.3 FEDERAL REQUIREMENTS.

1.3.1 Affected Water Systems. Public Law (PL) 107-188, Title IV of the *Public Health Security Bioterrorism Preparedness and Response Act* of 2002 requires all installations with public drinking water systems serving populations greater than 3,300 to prepare or revise their ERP and incorporate the results of vulnerability assessments (reference 1).

1.3.2 Submission Deadline. A letter must be submitted to the EPA certifying that a water system ERP has been developed in accordance with (IAW) the water system vulnerability assessment (Appendix B). A certified letter must be submitted for each community water system (CWS) that serves greater than 3,300 persons. This certification letter must be submitted to the EPA no later than 6 months after the submission of the vulnerability assessment (reference 1). Water system personnel responsible for compliance should submit this letter once the ERP is completed. Table 1 describes the submission deadlines in detail.

Table 1. EPA Submission Deadlines for the ERP Certification Letter

Water System Type/Population Served by Water System	EPA Submission Deadlines For the ERP Certification Letter
CWSs serving 100K or more[1]	N/A (no large Army CWSs)
CWSs serving 50K – 99,999[1]	By 1 Dec 03
CWSs serving 3,301 to 49,999[1]	By 31 May 04

1. Includes consecutive treatment and distribution-only systems.

1.3.3 Plan Requirements. The *Bioterrorism Act* specifically requires that a water system ERP "shall include, but not be limited to:

1.3.3.1 Plans, procedures, and identification of equipment that can be implemented or utilized in the event of a terrorist or other intentional attack on the public water system, and

1.3.3.2 Actions, procedures, and identification of equipment that can obviate or significantly lessen the impact of terrorist attacks or other intentional actions on the public health and the safety and supply of drinking water provided to communities and individuals."

1.3.4 Local Emergency Planning Committee Coordination. The *Bioterrorism Act* also requires that "community water systems shall, to the extent possible, coordinate with existing Local Emergency Planning Committees (LEPCs) established under the Emergency Planning and Community Right-to-Know Act when preparing or revising an emergency response plan." At the community level, the LEPC prepares and implements an ERP for responding to chemical incidents. In addition, the committee also handles, files, and tracks reports submitted by industry as well as prepares data for delivery to the public. Some LEPCs play a broader role by conducting educational programs to help the public understand safety risks and meet frequently to discuss these issues while others may meet infrequently and do not have many resources. The size and role of the LEPC are usually community specific. LEPCs should be contacted to review the emergency plan, material safety data sheets (MSDSs), and inventory forms. A listing of more than 3,000 LEPCs as of October 2003 can be found at the EPA's Chemical

Emergency Preparedness and Prevention Office (CEPPO) website http://www.epa.gov/ceppo/lepclist.htm.

1.3.5 Record Maintenance. According to the *Bioterrorism Act*, "each community water system shall maintain a copy of the emergency response plan for 5 years after such plan has been certified to the [EPA] Administrator."

1.3.6 Small Public Water Systems. A water system ERP for CWSs serving a population of less than 3,300 persons are not required under the *Bioterrorism Act*; however, a water system ERP must be developed to comply with DOD and Army requirements.

1.4 STATE REQUIREMENTS.

During a water system ERP project, State drinking water agency representatives should be contacted to determine if any state water system requirements apply. Many states have specific emergency management planning guidelines, while some do not. The water system ERP should comply with all State requirements.

1.5 DOD AND DA REQUIREMENTS.

1.5.1 Policy. A DOD (reference 2) as well as a DA (reference 14) policy memorandum require that all installations with drinking water systems serving greater than 3,300 persons prepare ERPs and submit a certified letter to the EPA. In addition, the DA memorandum requires that any installation with a water system serving greater than 25 persons worldwide prepare a water system ERP (Table 2). Submission of certified letters for small systems (< 3,300) to the EPA is not required. All original and copies of ERPs should remain at the installation.

1.5.2 Regulation. Army installations should have an emergency water supply plan IAW AR 420-49 (reference 2) as part of the Water Resources Management Plan. AR 420-49 specifically states that contingency plans should be IAW AWWA Manual No. 19 (reference 4), TB MED 576 (reference 5), and primacy State guidance. AR 420-49 also requires that contingency plans be developed for "national or local emergencies (enemy, attack, mobilization, subnormal service, main breaks, and fires)" (reference 2). Army installations outside the continental United States (OCONUS) are required to have a water system ERP IAW the Overseas Governing Baseline Guidance Document (OEGBD) (reference 15). The OEGBD requires that the emergency contingency plan identify key personnel; procedures to restore service; procedures to isolate damaged lines; alternative water supplies; installation public notification procedures; and conduct an evaluation of the susceptibility of the water source, treatment, storage and distribution system(s) to disruption of service from natural disasters, accidents, and sabotage.

Table 2. Department of the Army ERP Completion Deadlines

Water System Type and Population Served by Water System	Within 6 months after VA[1] Completion or by the DA Deadline Provided
CWSs serving 100K or more[2]	N/A (no large Army CWSs)
CWSs serving 50K – 99,999[2]	1 June 2003
CWSs serving 3,301 to 49,999[2]	31 December 2004
CWSs (CONUS) serving 26 – 3,300[3]	31 May 2006[5]
CWSs (OCONUS) serving more than 25[3]	31 May 2006[5]
CONUS nontransient noncommunity systems serving more than 25[3]	31 May 2007[5]
CONUS transient noncommunity systems serving more than 25[3]	31 May 2008[5]
CONUS unregulated systems (e.g., certain privatized systems) serving more than 25[4]	31 May 2008[5]
All other OCONUS water systems serving more than 25	31 May 2007[5]

1. VA is an abbreviation for vulnerability assessment.

2. Includes consecutive treatment and distribution-only systems.

3. Includes consecutive treatment systems. Distribution-only systems are considered unregulated systems (see #4 below).

4. Unregulated systems are those public water systems that are not required to comply with National Primary Drinking Water Regulations (NPDWR) under 40 CFR 141. An unregulated system receives water from a regulated public water system, does not sell any water received, and does not provide additional treatment to water received.

5. Submission of documents to HQDA is not required. All original copies of ERPs shall remain at the installation. Certification of ERPs to HQDA is not required; although, notification of completed ERP is required to HQDA.

1.6 POST PLAN DEVELOPMENT.

1.6.1 Ownership. Typically, the installation public works authority should maintain the original water system ERP. In some cases, however, the emergency operations center (EOC) may maintain the original due to their unique mission of emergency response and management. Regardless of what organization possesses the original ERP, all organizations that may be involved in a response to a water system emergency should have a copy and at least one copy should be located in the installation's EOC.

1.6.2 Review. Developing the ERP is a good first step in preparing for a water system emergency response situation; however, it is only information within a document. The ERP is merely a tool to be used by people. The primary users of this plan should review it prior to its completion, provide recommendations for improvement, and become familiar with its contents. The ERP should be treated as a "living" document and requires at least annual updates. If the water utility system configuration

or management undergoes a major change, updates should be conducted more frequently. Once the ERP is updated, the plan should be redistributed and the older plans should be collected and destroyed.

1.6.3 Training. All installation personnel that may respond to a water system emergency (terrorist attack or natural disaster) should be familiar with their roles and responsibilities outlined in the ERP prior to an actual emergency. A critical step in emergency preparedness is the execution of a water system tabletop or field-level exercises. Exercises help determine the ERP's strengths and weaknesses, and identify needed plan improvements. These types of exercises will also bring together representatives from various directorates on the installation prior to the time of an actual emergency.

1.7 DOCUMENT COPIES AND SUPPORT.

Copies of this TG and additional support can be obtained by contacting the United States Army Center for Health Promotion and Preventive Medicine (USACHPPM) Water Supply Management Program at Water.Supply@apg.amedd.army.mil or by using commercial telephone at (410) 436-3919.

1.8 REFERENCES.

A list of references used to prepare this TG can be found in Appendix A.

1.9 ABBREVIATIONS AND TERMS.

Abbreviations and terms used in this TG are explained in the glossary.

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Chapter 2
Disaster Hazards to Consider

2.1 HAZARDS.

When developing an ERP, potential hazards must be considered. A hazard is a source of potential damage that interferes with the ability to deliver potable water of adequate quality, quantity, and/or pressure. Natural disasters are hazards and include all emergencies except those created as a result of enemy attack or civil disturbance. The following paragraphs identify the most probable natural and manmade disasters and their associated consequences.

2.2 NATURAL DISASTERS.

2.2.1 Hurricanes. Hurricanes are severe tropical cyclones having sustained winds of at least 74 miles per hour or greater and are a primary threat to aboveground components of the water system (e.g., storage tanks, uncovered treatment processes). A hurricane could damage elevated storage tanks and exposed transmission lines as well as result in loss of power. Flooding can also occur due to the immense volume of rain deposited in a short period of time. Flooding could result in source water contamination or inoperability of water system treatment and pumping equipment. Water main breaks could result in the potable water system being contaminated.

2.2.2 Nor'easters. A Nor'easter is a violent winter storm capable of depositing large amounts of snow and rain in a relatively short period of time. Nor'easters can affect both the distribution system and the water treatment plant (WTP). Frozen ground can crack distribution system piping. Excess snowmelt could cause an overload in the WTP similar to the effect of a flood during a hurricane. Nor'easters could also affect communications, power transmission systems, and personnel thus impairing the ability of installation personnel to respond to emergencies.

2.2.3 Tornadoes. Whirling winds accompanied by a funnel-shaped cloud are referred to as tornadoes. Usually, tornadoes are associated with other violent weather such as thunderstorms and hurricanes. Although tornadoes can be tracked by radar, they are extremely difficult to predict and often result in high mortality rates. Tornadoes cause extensive structural damage as aboveground facilities are rarely designed to withstand tornado-force winds. Critical water system components likely to be affected include WTPs, buildings, tanks, electrical transmission lines, telemetry system components, and exposed transmission piping. Tornadoes can also disrupt administrative and operational procedures, transportation, and communications, limiting installation personnel response to emergencies.

2.2.4 Floods. Flooding can be caused by heavy rainfall and melting of frozen precipitation. Typically, flooding due to precipitation is easy to predict and defend against provided that sufficient funds are available to take preventive measures. As

indicated above, flooding can be one consequence of a hurricane or Nor'easter. Flooding through excess runoff into the WTP could overload the treatment processes and contaminate the WTP. Surface water runoff due to flooding can contaminate surface water sources and ground water under the direct influence of surface water by introducing chemical and microbiological contaminants. Flooding could also result in the loss of electricity, transportation, and communications.

2.2.5 Fires. Forest or brush fires can occur anywhere such vegetation exists particularly in areas affected by dry weather or drought. Structural fires on an installation can be caused by storms, accidents, or vandalism. Many of the World War II-era buildings on Army installations are constructed primarily of wood which makes them especially vulnerable. Large forest or brush fires could damage electrical power transmission lines and distribution system equipment and disrupt communications infrastructure. A significant fire on the installation could deplete potable water supplies. Another consequence is that the water flow necessary to fight a massive fire could rupture pipes in the older sections of the distribution system. Fire at a WTP could destroy telemetry equipment, repair stock, system equipment, and supplies. Any large-scale fire is likely to disrupt administrative and operational procedures.

2.2.6 Severe Weather. Periods of harsh cold or heat, blizzards, high winds, and ice storms are some examples of severe weather. Administrative and operational procedures can be disrupted by severe weather. Severe weather can have both long- and short-term impacts on the water system. Extreme periods of low temperature conditions could freeze valves, pipes, and storage structures. Ice storms could damage power transmission lines, interrupt transportation and supply deliveries, and disrupt communication equipment. Deep snow can prevent water utility personnel from accessing treatment facilities and prevent supply deliveries. Hot weather can cause droughts and increase the threat from fire by drying out existing vegetation.

2.2.7 Earthquakes. Earthquakes are caused by a shift in the plates beneath the earth's surface. The resulting effect is stress and strain on structures that can result in structural failure. Structural integrity of all water system components (pipes, hydrants, buildings, basins, chemical containers) can be affected by an earthquake. An earthquake could cause main breaks, building collapses, and chemical leaks. Oscillating levels in water tanks could also cause structural damage to the support beams, possibly requiring repair work or temporary shoring.

2.2.8 Water Contamination. Microbiological contaminants such as viral, bacteriological, and toxicological agents can cause waterborne disease. Waterborne illness is typically the result of some other action, such as a tornado shattering the distribution system's piping and causing backflow into the system, but can also be the result of natural changes in the source water or cross-connection within the distribution system. Contamination by disease-causing organisms could cause a temporary disruption of water service while utility personnel isolate, disinfect, and flush the contaminated portion(s) of the system.

2.3 MANMADE DISASTERS.

2.3.1 Targets. The following manmade threats are of concern to Army installations by virtue of the installations' prominence within the U.S. government and the U.S. Army. Several of the organizations located on Army installations present high value targets for terrorists. Fires, accidents, and/or acts of vandalism are also potential manmade threats.

2.3.2 Terrorism. Terrorism is the use of force or violence against persons or property, in violation of the criminal laws of the United States, for the purpose of intimidation, coercion, or ransom. The sabotage of a public drinking water system, or the threat to do so, is a Federal offense (reference 16). Terrorism can be domestic, international, or both. Acts of terrorism targeted against an Army water system could come in the form of chemical, biological, radiological, nuclear, and explosives (CBRNE) attack. Targets could include one or more of the following: water system personnel, buildings, source components, treatment processes, chemical storage facilities, distribution system components, pumping equipment, and supervisory control data acquisition systems (SCADA). Specific categories of terrorism upon water systems are described below.

2.3.2.1 Malicious physical destruction of a water system asset (e.g., distribution system pipe, storage tank, pump building, or intake structure) should result in an installation response. In particular, destruction of parts of the distribution system piping could limit the ability to fight fires on the installation and reduce decontamination water supplies. Generally, recovery from a physical destruction event can be handled by local resources although such an event will likely involve a criminal investigation by the Federal Bureau of Investigation (FBI). Physical destruction attacks should not be approached by public works or preventive medicine (PVNTMED) personnel. Often secondary explosive devices can detonate causing more destruction and casualties. Law enforcement should be called whenever physical destruction is suspected or has occurred.

2.3.2.2 Intentional contamination could target the water source, water plant, storage tanks, or transmission lines. Depending on the attack type, intentional contamination could be far-reaching or affect only a small portion of the water system. Chlorination should not be immediately implemented if contamination is suspected or determined. Several chemicals have been identified as producing more toxic byproducts when in the presence of chlorine. In addition, some biological agents are resistant to chlorine and will remain a threat. Recovery from an intentional contamination event will require local, State, and Federal involvement and should not be handled by the installation alone.

2.3.2.3 A cyber attack directed at the SCADA system could be launched from a location in or outside the U.S. Unlike previously mentioned threats, SCADA attacks involve persons using computers and remote electronic equipment. Results of SCADA

attacks could cause overfeeding of treatment chemicals, denial of service, and phony water quality/operations readings (e.g., chlorine, pressure, pump rate).

2.3.3 Vandalism. The willful or malicious destruction or defacement of property is an act of vandalism. Vandals could damage water treatment facilities, pumping stations, water storage tanks, hydrants, and administrative offices. Water supplies could be intentionally contaminated or depleted. Strikes by utility personnel or other workers could result in diminished water production and supply. Strikes might also result in vandalism, sabotage, or interference with supply deliveries.

2.3.4 Accidents. Accidents could damage water system components and contaminate the water sources either through direct or cross-contamination. Accidents may include vehicle collisions, damage caused during construction, hazardous material spills, and aviation accidents. Spills of hazardous materials could contaminate the surface and ground-water supplies. An accident at the WTP could disrupt the ability of the installation to provide and obtain potable water.

Chapter 3
Preparing the Installation for a Water System Emergency

3.1 NATURAL DISASTER PREPARATION FOR PUBLIC WORKS.

3.1.1 General Considerations. Water system emergencies are frequently caused by natural disasters. One of the most common emergencies is caused by water line breaks and results in contamination of the distribution system. Once water lines are damaged contaminated soil and water can be sucked into the water line due to low pressure. Systematic flushing is then required to remove the foreign debris. Disinfection and the issuance of a boil water advisory to notify affected customers are also required actions. Chapter 2 describes other events that cause water system emergencies.

3.1.2 Historical Significance. Army installations have experience in dealing with natural disasters. Since natural disasters can usually be forecast, installation personnel can take actions to prepare for the event. Preparations for a water system emergency can have a profound effect on the ability of the system to operate continuously and provide safe drinking water. By preparing and allocating resources to mitigate suspected consequences, the loss of life and property can be lessened.

3.1.3 Backup Power. If a natural disaster can be forecast, public works should make certain backup power supplies for the WTP, chemical feed equipment, and pumps are available. Specifically, power for chemical feed equipment (including disinfection) should be obtained. During power outages safe potable water cannot be supplied to the distribution system if it cannot be disinfected.

3.1.4 Supplies and Equipment. Public works should also ensure that water treatment chemical supplies are adequate. Roads at the chemical supply company or those leading to the WTP can become blocked due to law enforcement activity or road obstructions (e.g., trees and power lines). Water systems must be able to continue to operate and reach into onsite chemical supplies during emergencies (e.g., a 2-week onsite supply is recommended). Replacement piping and appurtenances also need to be available to repair the system should it be damaged. Heavy equipment such as excavators, front-end loaders, and backhoes should also be checked for operability. Some of the most frequently forgotten supplies are sample bottles and preservatives. Water sampling equipment is vital to determining if the water is safe to drink. Equipment supplies (e.g., bottles and media) should be maintained in adequate quantities preceding an approaching severe weather disturbance. Supplies and equipment should be available to promote an efficient and effective response.

3.1.5 Chemical and Bacteriological Monitoring. Chemical and bacteriological water quality monitoring results should be scrutinized before, during, and after the hazard. Natural disasters could change the source water quality and damage facilities.

Damaged facilities could allow contaminated water into the distribution system. To quickly detect a problem, the source water, WTP, and distribution system water quality sampling and analysis frequency should be increased. Free-available chlorine, pH, conductivity, coliform bacteria, and turbidity are all useful water quality indicators.

3.1.6 Sensory Monitoring. Public works should monitor aesthetic water quality of the source water, water plant, and water entering the distribution system. Water that has been contaminated will likely exhibit a noticeable taste, odor, color, or decreased clarity. Water that has bypassed certain treatment processes (e.g., filtration) may also have these qualities. Public works personnel should check sensory qualities of water using their sense of smell, specifically the Threshold Odor Test which is Standard Method 2150B (reference 17), and by visual inspection.

3.1.7 Drinking Water Consumer Surveillance. Public works should pay particular attention to drinking water consumer complaints. Should contaminated water enter the water system consumers will likely be the first to detect it. If a distribution main breaks, low pressure and/or colored water complaints could be reported. Guidance for improving the handling of customer complaints on Army installations is contained in USACHPPM TG 284 (reference 18).

3.1.8 Alternate Sources. Identifying and acquiring alternate water sources are also important preparatory actions. Storing supplies such as food and water before a natural disaster strikes can allow for responders to quickly and effectively respond and lessen the impact of the damaged water system. The Federal Emergency Management Agency (FEMA) recommends storing at least a 3-day supply of water for emergencies. Identifying local bottled water vendors and organic water production, storage, and distribution equipment prior to the natural disaster striking can help find alternate water sources.

3.2 PREPARING FOR INTENTIONALLY CAUSED EMERGENCIES.

3.2.1 Attack Objectives. Terrorist and other malicious attacks against water systems can have one or more objectives. These objectives can include inciting fear into citizens, causing bodily harm, destruction of property, or simply disrupting service. If a terrorist attack is suspected, public works should be in close contact with intelligence and law enforcement officials. At elevated Force Protection Conditions (FPCON), the likelihood of an attack is increased. Because of the heightened threat level, persons responsible for protecting, operating, and responding to the water system emergency should consider the actions described below.

3.2.2 Coordination. In an emergency response situation, representatives from public works, PVNTMED, and law enforcement will find themselves shoulder-to-shoulder facing the problems. For this reason, these organizations should develop cooperative relationships and make certain that the water system infrastructure and consumers are protected.

3.2.3 Public Works. Public works should implement all the natural disaster preparatory actions mentioned in paragraph 3.1. These actions will increase the chances of detecting water system problems and quickly responding to a water system emergency. In addition to the aforementioned actions, public works should: (1) contact the Contracting Office and mandate that all persons requesting access to fire hydrants obtain written approval from public works first and (2) ask law enforcement to prohibit access to fire hydrants without specific authorization by public works. Furthermore, public works should work more closely with PVNTMED to improve monitoring of distribution system water quality and investigating drinking water customer/consumer complaints.

3.2.4 MEDDAC / PVNTMED. Preventive medicine plays a critical role in the surveillance of drinking water quality and population health. As the medical linchpin of health protection and surveillance on Army installations, PVNTMED should monitor patient admittances at installation health clinics and hospitals. PVNTMED has the responsibility of determining if there are any health-related complaints linked to contaminated drinking water. PVNTMED should work closely with public works to monitor distribution system water quality and investigate drinking water consumer complaints.

3.2.5 Law Enforcement. Law enforcement officials need to work closely with public works personnel to protect infrastructure and detect an attack on water system assets. Public works personnel should familiarize law enforcement representatives with all critical water system facilities and estimate response time to each location. Should any water system asset be compromised, resident and workforce health could be at an acute health risk level. Law enforcement should coordinate water system threats or suspicious activity investigations with public works. In addition, law enforcement units should increase the patrol frequency of water system assets during increased threat conditions. Specific assets to survey include intake structures, well buildings, transmission lines, WTPs, storage tanks, fire hydrants, and pumping facilities. Law enforcement should also notify public works if any suspicious activity is found near one of these aforementioned assets. Suspicious activity includes any equipment connected to a hydrant or persons tampering with hydrants without written approval.

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Chapter 4
Intentional Contamination Overview and Sampling and Analysis Considerations

4.1 QUICK DECISIONS.

In the event of an attack, decision-makers from the installation and other responding organizations must be prepared to take actions before having the benefit of laboratory analyses. Sample collection, transport, and analysis require time, and the laboratory investigation results will not be known immediately. This limitation is particularly true for biological agents which may take several days to identify and quantify. Actions that may need to be taken without laboratory results are: (1) switching to an alternate water source, (2) isolating portions of the distribution system, (3) increasing disinfectant residual concentration, (4) shutdown of the entire water treatment facility, and (5) public notification.

4.2 BASIC CONTAMINATION INDICATORS.

If water is contaminated, water quality parameters will likely change or deviate from "normal." For that reason, water system data from daily operational logs should be compared against historical records. Operational parameters that should be checked during an investigation include raw and treated water disinfectant demand, pH, filter run times, conductivity, total organic carbon, total dissolved solids, and any reported customer complaints (e.g., tastes, odors, color, or low pressure). Water pressure measurements can also be informative because this data can help determine if a specific pipeline is experiencing overpressure (caused by the intentional feeding of contaminants) or under pressure (which could be the result of physical destruction or an attempt at intentional contamination). Customer complaints should also be scrutinized due to their unique nature of providing drinking water providers insight into water quality reaching consumer taps. Many chemical and biological contaminants can cause adverse health effects and change the aesthetic quality of the water when present.

4.3 CONTAMINANTS OF CONCERN.

4.3.1 Overview. Some of the contaminant information provided below was originally compiled by Camp Dresser & McKee and McKissack and McKissack. The USACHPPM has added several nuances and expanded upon some contaminant descriptions. Several water contaminant threat lists have been developed by the EPA and DOD, though this information was not provided for security reasons. If a water terrorism incident is suspected or confirmed, installations should work with approved laboratories, the USACHPPM, and State and EPA agencies to respond. One a case-by-case basis, the USACHPPM can provide installation's contaminant threat information. This chapter can be included in the installation ERP in its entirety.

4.3.2 Biological Agents. Biological agents are microorganisms that cause disease in personnel, plants, animals, or cause the deterioration of material. Pathogenic organisms, such as bacteria, protozoan, and viruses, are one type of agent while biological toxins are derived from organisms. Unlike chemical agents, biological agents can be used to target specific clinical results with varying degrees of severity. For example, certain biological toxins are fatal within minutes of ingestion, while some biological pathogens may produce lengthy and debilitating but nonfatal diseases. The following notes should be considered when a biological agent is suspected:

4.3.2.1 A biological attack may be disguised as a natural outbreak, thereby inciting panic while reducing the likelihood that law enforcement officials will discover and apprehend the perpetrator.

4.3.2.2 Incubation periods may mean that the onset of disease will not occur for hours to days after the attack. Late onset could complicate attempts to determine when and where the attack occurred.

4.3.2.3 Biological agents are relatively easy to produce. Production requires only a basic level of knowledge and skill in microbiology along with several pieces of easily obtainable equipment. Organisms may be isolated from nature or purchased at minimal cost.

4.3.2.4 Many biological agents are stable in water for days and even months. Several agents are resistant to free chlorine disinfection. Chloramines are not effective at destroying these agents as exhibited by the significantly greater disinfectant contact time (CT) required for chloramines than free chlorine to inactivate *Giardia* and *Cryptosporidium* under typical water quality conditions.

4.3.3 Chemical Agents. There are a variety of weaponized chemical substances that are commonly referred to as chemical agents. These substances have varying degrees of toxicity and persistency. Chemical agents are not widely available or easy to obtain. Other toxic compounds such as pesticides, rodendicides, herbicides, and petroleum products are commercially available and easy to obtain. Terrorists are more likely to use these compounds to chemically attack a water supply.

4.4 SAMPLING AND ANALYSIS.

4.4.1 The Public Works and PVNTMED Role. During the contamination investigation, public works and PVNTMED personnel would: (1) help emergency responders determine the location of drinking water sampling points, and (2) provide emergency responders with maps of the water system as well as specific water quality and operational information. An FBI or hazardous materials (HAZMAT) team would likely collect water samples and arrange for laboratory identification of the contaminants. Components of an emergency water collection and test kit are described in Appendix G.

4.4.2 Specific Procedures. The ERP should provide general considerations for sampling and analysis. During an actual response, emergency action procedures, or those actions detailing how a response will unfold, should be developed and executed. Emergency action procedures should be created in cooperation with laboratories, law enforcement agencies, and public health agencies. Emergency action procedures will reduce misunderstanding and enhance communication between responding organizations.

4.4.3 Sampling Plan. Sampling should be conducted at multiple sites in the isolated area of known and suspected contamination. Additionally, samples should be collected around the perimeter of the isolated area to (1) establish background concentrations of the analytes and (2) confirm the extent of contamination. A map of the distribution system should be included in the ERP and point out the following locations: child development centers, hospitals, troop medical clinics, garrison command headquarters, garrison command residences, and other on-post housing. Also, this map should indicate all water system assets (e.g., source, buildings, and storage tanks) and depict where the water system personnel regularly collect samples for bacteriological compliance monitoring.

4.4.4 Sampling Methodology. The analyzing laboratory should provide the installation with instructions and methods for effective sample collection. Examples of the sampling requirements to be established by the laboratory are outlined below:

4.4.4.1 Specify the appropriate sample containers including the container size, material (e.g., glass or plastic), and cleaning instructions.

4.4.4.2. Determine whether samples should be chemically preserved. If so, the laboratory would determine the type of and concentration of preservative and would probably provide pre-washed sampling containers with the appropriate preservative added prior to sampling.

4.4.4.3. Provide special instructions or procedures for sample collection (e.g., exclusion of headspace in the sample and appropriate procedures for preventing cross-contamination).

4.4.4.4. Provide guidance to the installation in determining special safety requirements for sampling personnel.

4.4.5 Quantity of Samples. The number and volume of samples collected should be coordinated with the laboratory. Samples must be of sufficient volume to allow the laboratory to perform necessary analytical procedures. In general, triplicate samples are required to determine the statistical variability in analytical results. If other local or Federal agencies collect samples from the distribution system, the installation may want to consider collecting similar samples for independent analyses and verification.

4.4.6 Handling and Shipping of Samples. Proper handling and shipping are critical aspects of the sampling process. The installation should consult with the analyzing laboratory to determine the appropriate procedures. Also, the installation should contact the HQ USACHPPM at Aberdeen Proving Ground, MD for additional guidance on packaging and shipping of suspicious water samples. Generally, handling will consist of proper labeling [e.g., sample identification (ID) number, location, date, time, sampler's name, and special instructions], tracking with an approved chain-of-custody form, and storing samples as directed by the laboratory (typically 4 ºC). Samples must be packaged to prevent spill and leaks during shipping.

Chapter 5
An Emergency Response Structure for Water Supply Emergencies

5.1 INTRODUCTION.

For years, Army installations have responded to and recovered from water supply emergencies caused by natural disasters (e.g., flooding, hurricanes, and tornadoes). Since Army installations encounter other different types of emergencies (e.g., law enforcement and rescue related), readiness and training of these resources is generally good. This chapter will explain how the water system emergency response mission fits into the existing installation emergency operations structure and will introduce the reader to accepted emergency response concepts.

5.2 PHASES OF EMERGENCY RESPONSE.

5.2.1 Crisis Management. Emergency response has two phases. The first phase is crisis management. Crisis management involves measures to identify, acquire, plan and use the resources needed to anticipate, prevent, and resolve a threat or act of terrorism. This emergency response phase is a law enforcement function and occurs when a threat is suspected or an act is initially investigated.

5.2.2 Consequence Management. Consequence management is the latter phase of emergency response and includes those measures taken to protect public health and safety, restore essential Government services, and provide emergency relief to governments, businesses, and individuals affected by the consequences of a terrorist attack. An example of consequence management includes medical management for illness resulting from exposure to a chemical intentionally injected into the potable water system. For domestic consequence management, the primary authority rests with the States to respond and the Federal Government to provide assistance, as required.

5.3 THE INCIDENT COMMAND SYSTEM (ICS).

5.3.1 Incident Response and Goals and Objectives. The ICS will be implemented during a response to a terrorist caused emergency. The ICS is part of the National Interagency Incident Management System (NIIMS) which was developed to provide a common system that emergency service agencies can use at local, state, and Federal levels. The ICS consists of procedures for coordinating personnel, facilities, equipment, and communications. The primary objective of the ICS is the safe application and management of resources to effectively and efficiently manage any incident. During a water supply emergency, the anticipated stages of the response are: (1) investigation, evaluation, and site characterization, (2) isolation and containment, (3) contaminant agent identification, and (4) decontamination and restoration of service.

5.3.2 ICS Structure. All incident responses will have an Incident Command unit. The Incident Command is comprised of an Incident Commander (IC) who may or may not have adequate resources under his/her control depending on the size of the incident. For medium- and large-scale incidents, installation and external resources are separated into four functional areas which are Operations, Planning, Logistics, and Finance. Each functional area is responsible for specific tasks of the incident as shown in Table 3 and is under the Incident Command. For small-scale incidents one person may be responsible for all of the duties listed in Table 3; although, for large-scale incidents, many people and local, state, and Federal agencies may be acting under each functional group. For large-scale incidents, groups and/or divisions within each functional group may be formed which are responsible for specific tasks (e.g., traffic control, evacuation, bottled water distribution, water transport and production, isolation of the affected distribution system).

Table 3. Responsibilities of the Command and Four Major ICS Functional Areas

ICS Organization	Responsibilities
Command	Overall management of the incident, incident safety, the interagency liaison, and public information; includes Safety Officer, Liaison Officer, and Public Information Officer; Incident Commander (IC) solely responsible, within the confines of authority, to establish objectives and overall management strategy
Functional Area	
Operations	Tactical activities which are directed toward the reduction of the immediate hazard; establishing situation control; restoration of normal operations
Planning	Collection, evaluation, dissemination of information about the incident, contingency planning
Logistics	Providing all support needs to the incident
Finance	Fiscal and risk management issues involved on an incident, including cost-tracking, time-tracking, procurement of contract services, and compensation and claims management.

5.3.3 ICS Evolution During an Emergency. As the incident command requires more resources to save lives, protect public health, and infrastructure, the ICS structure becomes more complicated. As mentioned above, resources used to respond and recover from the incident fall under four distinct functional areas. Within each functional area, the resources can be further segregated into groups. These groups can be assigned specific tasks (e.g., evacuation, water sampling and analysis plan development, triage, bottled water distribution, valve closing to isolate distribution system, door-to-door customer notification) which will help support the response.

5.3.4 Command Post, EOC, and Staging Area. As an incident unfolds, a command post (CP) is established near the incident site. The CP is the forward location where responders meet to discuss the situation. Typically, the senior fire official at the CP is the IC. This person is responsible for the incident response. If the incident cannot be handled by the responding resources alone, the emergency response command center called the EOC is officially activated. Many Army installations have one EOC located on post. The EOC is usually equipped with high-tech electronics to include communications equipment and equipped for handling command and control large-scale emergencies. Representatives from fire departments, law enforcement, intelligence, and public works, PVNTMED, and logistics will converge on this location to manage the crises and consequences of a large event. The EOC is separate from the CP. During the response, the IC will be close to the action and will relay information back to the EOC periodically. The personnel located at the EOC will acquire adequate resources to support the incident responders in the field and make notifications as appropriate. The staging area is the location where supplies and equipment go before they are sent to the CP. This type of emergency operations structure can be compared to a battlefield where logistics and support equipment are sent to support the forward units when requested.

5.4 WATER SUPPLY PERSONNEL ICS PARTICIPATION.

Depending upon the tactical objectives of the incident response, specific water system functional groups may be formed to complete specific tasks. Some examples are described below. Public works and PVNTMED personnel could potentially be asked to fill or lead one or more of these groups depending on the scale of the response effort. Figure 1 shows an example of how an ICS would be developed to include water system personnel during an intentional contamination emergency.

5.4.1 Sampling Group. This unit is responsible for coordinating the collection of water samples for laboratory analysis. Representatives of this group may not physically collect the samples, as HAZMAT crews may execute this mission. Persons collecting water samples should have a minimum of protection against exposure (e.g., gloves). At the discretion of the IC and law enforcement officials, the unit may work with the law enforcement community to secure and preserve evidence of biological, chemical, or radiological contamination.

5.4.2 Pumping Group. This group is responsible for coordinating pumping activities to minimize the propagation of contaminated water and, if possible, to supply safe drinking water to high-priority users such as hospitals and command centers.

5.4.3 Water Investigation/Valve Group. A water investigations and valve group will assist in the initial and ongoing incident assessment activities. This group will primarily develop a plan to isolate the affected infrastructure. The group will also coordinate with law enforcement as directed by the IC through the Operations Section. The water investigations/valve group will assist with implementation of the orders at the direction of the Operations Section by operating all system valves.

5.4.4 Repair/Disinfection Group. This unit repairs infrastructure, such as water mains or hydrants that are damaged during an incident, and prepares these components to be reintroduced into service.

5.4.5 Flushing Group. Unidirectional flushing or spot flushing will be implemented by the flushing group to clear water mains of contamination.

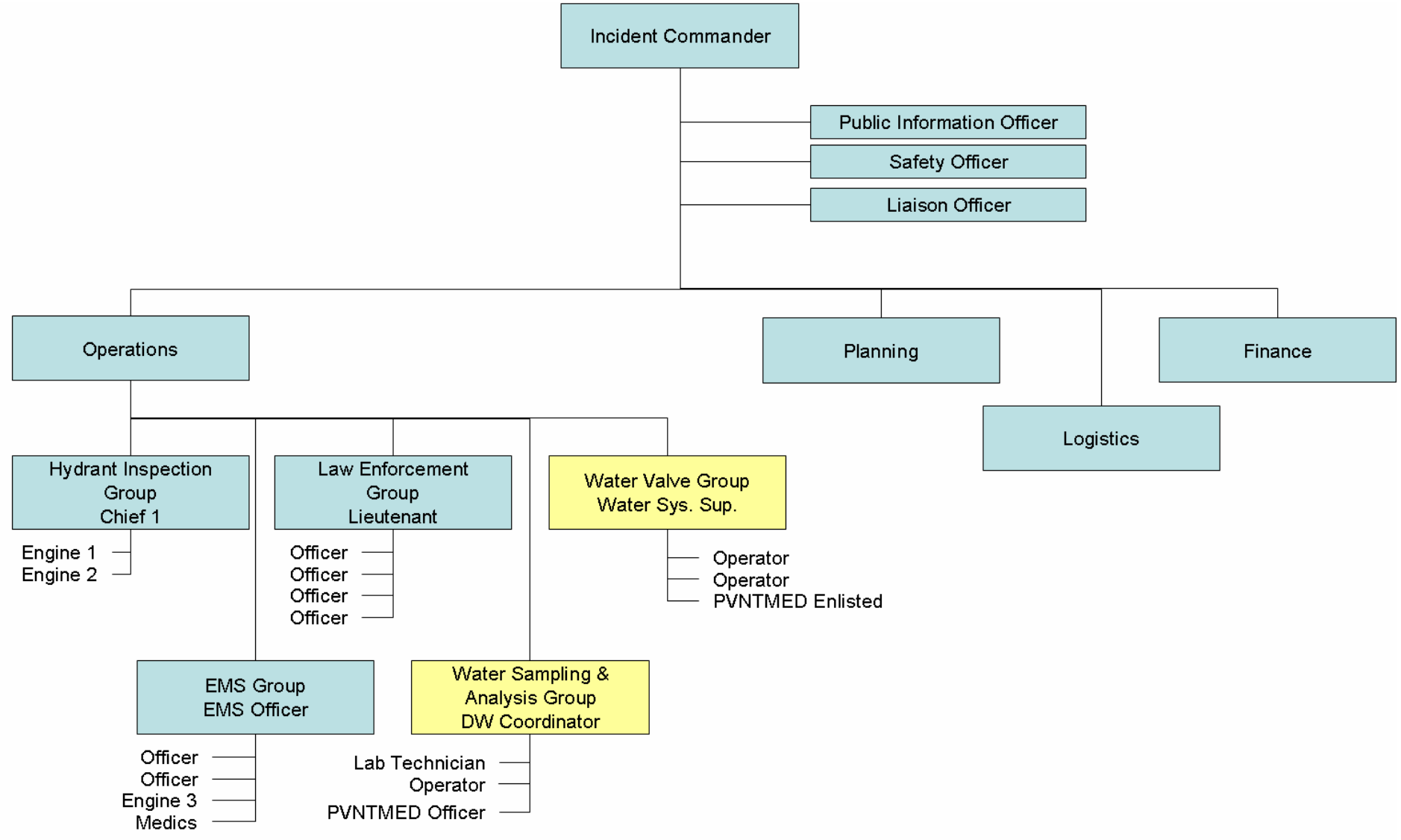

Figure 1. Example Command Structure for Responding to an Intentional Drinking Water Contamination Incident

5.5 EXAMPLE ICS FORMATION AND RESPONSE.

5.5.1 Summary. The following example of an ICS response was developed to educate readers on how an incident may unfold. The example below explains the actions surrounding a threat of intentional contamination to an Army water system. All components of the response are not provided due to the brevity of this document.

5.5.2 Discovery. At 0600 hours the water plant supervisor receives a telephone call from an unidentified person claiming to have contaminated a storage tank with a toxic contaminant. After collecting as much information as possible on the telephone, the water supervisor asks his system operators to inspect the storage tank with military police and alerts the Directorate of Public Works (DPW). Findings from the joint operator-police tank visit indicate the lock on the storage tank was cut, the tank hatch open, and a latex glove was found floating on the water surface. The responding patrol officer is designated as the IC and cordons off the area surrounding the storage tank to prevent access. At the direction of the IC, the water system operator that responds isolates the water tank by closing valves near the tank. The DPW chief is again notified.

5.5.3 EOC Activation. After notification by the water plant supervisor, the DPW chief contacts the Garrison Command Office at 0620. The DPW chief also alerts the Military Police and Fire Department of the ongoing investigation. By order of the Garrison Commander at 0630 the EOC chief requests that the following EOC representatives report to the EOC location: Garrison Command Office, Public Affairs Office (PAO), Law Enforcement, Force Protection, Intelligence, Public Works, PVNTMED, Logistics, Chaplain's Office, and Morale Welfare and Recreation (MWR). All EOC representatives arrive at the EOC at 0800.

5.5.4 Do Not Use Order. The EOC relies on information received from the CP and determines that affected customers must be notified not to use their water. The do not use order is issued in conjunction with the PAO and prohibits using water for showering, laundry, drinking, or cooking purposes. In addition, this order describes where consumers can pick up bottled water provided by the installation.

5.5.5 External Resource Acquisition and Use. At 0930 and at the recommendation of the EOC, law enforcement requests assistance from the local Weapons of Mass Destruction (WMD) Civil Support Team (CST) and FBI field office. While waiting for the WMD team to arrive, a Water Sampling and Analysis Group is formed to develop a sampling plan. The group includes the DPW Drinking Water Coordinator, PVNTMED Environmental Health Division Chief, and water system supervisor. Also, the DPW Service Order Desk and PVNTMED Environmental Health Division report that they have received several customer complaints that describe negative health effects near the suspect storage tank. The Sampling and Analysis Group considers this information in their sampling plan which includes the storage tank and several buildings around post where sensitive populations are located (e.g., daycare centers, schools). At 1000 the WMD CST and FBI teams arrive onsite. The CST collects and analyzes water samples from locations identified on the sampling plan and perform presumptive testing of the

water. Water samples are shipped to several DOD laboratories for confirmatory analyses. The State Drinking Water Agency and local EPA offices are notified at 1000.

5.5.6 Change-of-Command and Results. At 1100, representatives from the local FBI field office arrive at the EOC and request command of the incident because findings indicate that the water system has been attacked by terrorists. At this time, authority and command of the incident is transferred from the IC to the FBI. At 1130, CST water analyses field presumptive testing results return positive for a toxic contaminant inside the storage tank and throughout the distribution system. At 1140, at the direction of the FBI, local hospitals are put on alert to recognize and report unusual admittances and exposure symptoms, and a “Do Not Use” notice is prepared in coordination with representatives from the PAO, DPW, PVNTMED, and State Drinking Water Agency. The “Do Not Use” order requires that water in households and buildings should no be used for any purpose to include (e.g., toilets, bathing, firefighting, lawn watering, and recreational uses). To prepare for a long-term incident management, between 1140 and 1230 the installation logistics representative acquires temporary potable water production and distribution facilities from a reverse osmosis water purification unit (ROWPU) training team onsite. When the “Do Not Use” order is released the affected population is also told where and how they will receive replacement water.

5.5.7 The End of the Crisis Management Phase. Several days after the initial response to the incident, FBI, DOD, and Centers for Disease Control (CDC) laboratory sampling results confirm the presence of a specific toxic contaminant in the water. Water samples taken from the storage tank, household taps, and also from several daycare centers and schools near the tank were positive. Further investigation reveals that local hospitals admitted several patients showing contaminant exposure symptoms. The consequence management phase would begin once contamination was confirmed. The EPA and FEMA would provide assistance during this recovery phase. In addition, infrastructure decontamination and efforts to return the water system to normal operations would also take place under the consequence management phase.

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Chapter 6
General Roles and Responsibilities for Responding Organizations during Emergencies

6.1 OVERVIEW.

During an actual water system emergency, many organizations within the garrison command structure will support the response. Fire department and law enforcement organizations are the two most common responders. Because the emergency will involve the water system, public works and PVNTMED should be included in the response. Public works and PVNTMED should provide technical support to law enforcement, emergency service, and special response teams (e.g., HAZMAT, CST). As shown in Chapter 5, the response to a water system emergency will need to be well-coordinated with both public works and PVNTMED.

6.2 PUBLIC WORKS.

6.2.1 EOC. The EOC will serve as the installation focal point during an emergency. At the EOC, emergency responders and support staff will monitor conditions, direct responding emergency forces, and disseminate administrative/emergency notifications to installation activities and off-post organizations. On most Army installations, public works will be responsible for daily EOC staffing in addition to their housing, utilities, and operation and maintenance duties. Some installations may give the EOC responsibility to a newly established Directorate of Plans, Training, Mobilization, and Security (DPTMS). The new DPTMS focuses primarily on emergency planning and operations for the installation. On some Army installations, the EOC is also referred to as the installation operations center (IOC).

6.2.2 Environmental Regulatory Representation. The environmental office, either under public works or reporting directly to the Commander, serves as the IC's representative with outside environmental regulators. This organization provides guidance on environmental issues to ensure regulatory compliance and the provision of safe drinking water. To maintain compliance, this organization also makes certain that flushing, repair, disinfection, sampling, and system startup and shutdown water system operations are executed in accordance with State and Federal laws. Some of these responsibilities may be delegated to the company that holds the privatization contract or government contractor. Privatized water systems or those that are government-owned, contractor-operated (GOCO) typically result in fewer roles and responsibilities of public works. Nonetheless, public works is still responsible for water system oversight, establishing policy and approving expenditures as needed, supervising all utility operations, directing DPW personnel to include operations at the WTP and repair of water mains, and coordinating equipment (e.g., excavators, dump trucks) and personnel (e.g., plumbers, electricians, and welders) to effect repairs outside the scope of WTP personnel. While this delegation alleviates some responsibility, public works is still

responsible for overseeing the contract activities to protect the health of the installation's workforce and residents. Public works is also responsible for the disposition of waste generated and requirements for open air monitoring throughout the event.

6.2.3 After Action Review. Public works should conduct an after action review (AAR) no more than 7 days after the exercise or incident. AARs allow participants to provide feedback for future training and identify challenges that need to be addressed. Following the AAR, the results of the AAR should be published and furnished to all participants. As future exercises are conducted public works should track response improvements. Chapter 9 describes AARs in detail.

6.3 PREVENTIVE MEDICINE.

A PVNTMED liaison should help public works investigate and respond to an emergency. PVNTMED should also support law enforcement, medical surveillance, and treatment. Specific responsibilities of PVNTMED include: reporting the number of patients admitted to health clinics and hospitals; providing advice and guidance to commanders of other activities in the symptoms and treatment for persons exposed to chemical, biological, and radiological contaminated water; notifying the EOC of any fatalities and disposition of casualties released or transferred form the medical facilities; and coordinating with off-post medical facilities.

6.4 JOINT PUBLIC WORKS AND PREVENTIVE MEDICINE RESPONSIBILITIES.

Public works and PVNTMED are entirely responsible for the health of installation drinking water consumers with respect to the production of safe, clean drinking water. It is vital that these organizations have a good working relationship established before the emergency occurs. Public works and PVNTMED should notify one another and jointly investigate any suspected drinking water problems.

6.4.1 Do Not Drink Orders and Water Shutoff Notification Plan. Do not drink orders and a water shutoff notification plan are integral parts of responding to a water system emergency. Closing valves can allow the emergency responders to contain and isolate the suspected contaminated water, thereby reducing the number of persons exposed. Public works and PVNTMED are responsible for identifying valves that need to be closed. Such isolation could result in parts of the system being cut-off from drinking water particularly in poorly looped systems. If consumers are going to lose access to drinking water, public notification must be coordinated with the PAO representative at the EOC. Shutdown and startup of the WTP can also prevent the spread of contamination.

6.4.2 Water Sampling Plan. During a water system emergency, an emergency sampling plan should be developed by public works and PVNTMED. This plan should attempt to characterize the water throughout the entire distribution system and focus near the affected area. Sampling plans should be based on all available information that is known at the time of the response. Plans should at a minimum include water

sampling near the incident site, as well as near or in buildings considered high-risk targets such as child development centers, command centers, and dining facilities. A minimum set of three samples at each site is recommended. Emergency responders (e.g., HAZMAT, FBI, CST) may actually execute the sampling plan depending on the suspected health risks. If emergency responders choose to execute the sampling plan their representatives must be trained on how to collect, package, and transport water samples to the analyzing laboratory. Above all, responders must make certain that the level of personal protective equipment (PPE) used during collection, packaging, and shipping of water samples with unknown contaminants is adequate. Recommendations on PPE are the responsibility of the Safety representative at the EOC. Public works and PVNTMED representatives must make certain that sample chain-of-custody forms are signed, dated, and accurate and sent along with the water samples.

6.4.3 Laboratories Chosen for Analyses.

6.4.3.1 Public works should coordinate with appropriate laboratories for emergency analysis of water including potential unknown contaminants. Laboratory capability should run the spectrum outlined in EPA Guidance. Likely, investigators will need to coordinate with multiple laboratories to achieve full capability of analysis. The following laboratories listed below should be considered. DOD laboratories are highly recommended.

- The FBI recommended laboratories. Contacted through the FBI by the EOC Director.
- The Army National Guard (ARNG) regional WMD CST. Contacted through the Georgia National Guard Commander by the EOC Director.
- The EPA recommended laboratories. Contacted through the EPA Region IV office by the DPW Director.
- The USACHPPM laboratory at Aberdeen Proving Ground, MD. Contacted through the Commander, USACHPPM or the USACHPPM 24-hour Staff Duty Officer by the DPW Director or PVNTMED Chief.
- The CDC recommended laboratories. Contacted through the CDC headquarters (HQ) office by the DPW Director or PVNTMED Chief.

6.4.4 Water Emergency Restrictions. The Garrison Commander should decide when to implement water emergency restrictions and conservation measures. The decision should be weighed against health risks posed by the suspect contaminated water and impact on the mission. Before the decision is made, public works and PVNTMED personnel should estimate how much water is required and determine where the emergency water can be obtained. The installation logistics organization, Directorate of

Logistics, usually has several vendors available to provide water during non-emergency conditions. Public works should have a list of alternate water supplies in their water system ERP.

6.4.5 State and Federal Notification. Communication with State and Federal regulatory agencies should be handled by one organization. At most Army installations, this is a responsibility of public works environmental office. Public notifications such as the issuance of Boil Water Advisory, Do Not Use Notice, and news releases should, if possible, be coordinated with regulatory agencies. The issuance of public notices will have far-reaching affects on the health and psychological state of the local population. A united installation-regulator response will demonstrate to the public that their health is the highest priority. Regulatory agencies should also help coordinate the cleanup of any contaminated material, decontamination of affected infrastructure, and disposal of contaminated solids, slurries, and liquids.

6.4.6 Water Quality Review.

6.4.6.1 If contaminated drinking water is suspected, both public works and PVNTMED should scrutinize water quality. First, chemical and biological water quality data at the source, WTP, and throughout the distribution system should be compared against typical data for those parameters (e.g., previous records). Specifically, chlorine demand, free chlorine residual concentration, pH, conductivity, total organic carbon, turbidity, and bacteriological results should be examined for values outside of typical variability.

6.4.6.2 Second, water system operational monitoring and control indicators should be reviewed to include raw water quality, filter effluent turbidity readings, filter run times, distribution pressure readings, and storage tank water levels.

6.4.6.3 Third, any recent customer complaints to either public works or PVNTMED should be collected and analyzed. Since customers can detect tastes and odors of contaminants present at part per trillion levels, their feedback is very important. Analysis should include plotting complaints on a map and comparing them to one another and previous complaint records. Public works and PVNTMED should evaluate customer complainant location, time and date reported, complaint description, any information concerning aesthetic qualities reported by the consumer such as water taste, odor, color, and clarity. Any public works or PVNTMED field investigation test results for the complaint or sensory results should be reviewed too.

6.4.7 Population Surveillance. Public works or PVNTMED should contact local medical clinics and hospitals to determine if any reported illnesses have been linked to drinking water. The following information from the patient's recent medical report is useful: patient's residence address, work location, exposure signs and symptoms, time reported/admitted, complaint description, and any information concerning aesthetic qualities reported by the patient such as water taste, odor, color, and clarity.

6.5 SAFETY.

An installation safety office representative will likely be sent to the CP and/or EOC during a water system emergency. The safety representative should advise the IC regarding the safety and health of the response team members, workforce, and the general public. The safety representative is responsible for advising the emergency responders about the proper level of PPE required, safety procedures for collecting and shipping water samples, structural excavation, facility evacuation procedures, personnel accountability, and confined space safety.

6.6 FIRE AND EMERGENCY SERVICES.

6.6.1 Important Organizations. Emergency service organizations such as the fire department and ambulances play a pivotal role in saving lives and minimizing property damage. Upon arrival at the incident site, the senior fire department officer will act as the IC and designate a CP. If the CP is already established by a law enforcement official onsite, the fire department officer will take charge and be designated the IC. The IC is responsible for determining whether or not HAZMAT or criminal activity are involved in the emergency. The CP is usually located near the incident site and will be the base of field operations. Other responsibilities of emergency service organizations include performing immediate personal decontamination, rescue, first aid, fire-fighting, and evacuation.

6.6.2 Fire-Fighting. The IC will decide to perform fire-fighting functions based on an evaluation of all known factors including the type of hazard (chemical, biological, radiological). The IC will need to determine if water lines have been contaminated in the area affected. If this is the case, the senior firefighter should consider trucking in water to fight fires instead of using hydrants in that vicinity which may spread the contaminant and create more hazardous conditions.

6.7 LAW ENFORCEMENT AND INTELLIGENCE.

6.7.1 Law Enforcement. Law enforcement plays a pivotal role in securing and safeguarding Army installations. During an emergency, the law enforcement representative at the EOC will direct their organizational resources to respond to the event. Law enforcement responsibilities could include setting up initial security perimeters at a suspected incident scene which may increase or decrease in size as new information becomes available. Other law enforcement responsibilities include:

- Barricading roads,
- Controlling traffic,
- Preventing entry of/exit of vehicular or pedestrian traffic,
- Securing military and personal property,
- Setting up defensive perimeters on one or multiple water system assets,
- Preventing tampering with fire hydrants,
- Reporting any equipment connected to fire hydrants, and
- Restricting access to or lock down any water system component.

Law enforcement usually provides police and security forces to investigate suspicious hydrant connections and potential tampering of water system property, enforces water emergency restrictions and water conservation measures, escorts vehicles carrying suspect or confirmed contaminated water samples or contaminated materials to the receiving laboratory, and assists in evacuating and aiding nearby personnel to limit exposure to drinking water contaminants.

6.7.2 Intelligence. Depending on the installation, law enforcement may also have the role of rendering intelligence services to evaluate received threats on the water system using the local, regional, and DOD intelligence communities. Several military installations have a military intelligence unit external to the local law enforcement component.

6.8 OTHER INTERNAL INSTALLATION RESPONDERS.

Other organizations on post can become involved in a large-scale water system emergency. These include the offices of logistics, chief counsel, staff judge advocate, chaplain, information management, public affairs, and resource management. Table 4 explains general responsibilities for these organizations. Representatives from these groups will be sent to the EOC. Table of Organization and Equipment (TO&E) units stationed on post may also be called to support the incident. Some TO&E units have generators and field water production, storage, and distribution equipment.

Table 4. General Responsibilities for Other Internal Installation Responders.

Organization Name	Responsibilities
Logistics	Provide equipment, property, food service support, transportation to response and recovery sites, and transportation for the evacuation of personnel; establish priority of maintenance support for vehicles and equipment that are used in the support of response and recovery forces.
Chief Counsel and Staff Judge Advocate	Provide legal advice and support to all affected commanders and staff and establish liaison and channels for coordination with military, Federal, state, and local legal and law enforcement agencies.
Chaplain	Coordinate stress management and crisis event debriefings for responders and supporting personnel, provide advice and assistance on religious and morale matters; organize, mobilize, and employ Chaplain crisis response teams; and maintain liaison with local clergy associations to ensure religious and moral support for military and family community matters.
Information Management	Provide communications equipment, systems, and facilities such as trunked portable radio equipment to support sustained operations.
Public Affairs	Act as the installation spokesperson; release information to the public and respond to queries from news media, elected officials and others; and conduct briefings to initial responders, emergency operations center personnel, and public affairs personnel. Also, review responses to the County Department of Health to reflect the Command Group's input.
Resource Management	Ensure that adequate funds are available in the garrison budget to support the performance of the water system emergency operations, provide for collection of extraordinary expenses (e.g., overtime, special equipment, etc.) for actual situations, and send requests for emergency funds and reimbursement through the major command or regional installation management office.

6.9 STATE ARMY NATIONAL GUARD.

The State ARNG could be called in to help respond to and recover from a water system emergency. This organization is a State asset and must be requested by the EOC through the Governor's office. The ARNG could provide air transport support within existing capabilities as requested through the State. This organization can also provide onsite WMD CST assistance.

6.10 HQ USACHPPM.

The HQ USACHPPM can provide onsite or remote assistance. Specifically, the USACHPPM can evaluate water system threats, analyze for unknown contaminants, help develop or provide public information, assist in the selection of decontamination strategies, and determine health/environmental criteria for water system emergency activities. The USACHPPM can also provide post-incident, low-level, environmental monitoring, data interpretation, and risk assessment. The USACHPPM cannot provide first response monitoring. All requests for emergency assistance must be directed to the headquarters office located in Aberdeen Proving Ground, MD USA.

Chapter 7
Project Administration

7.1 AUTHORITY.

7.1.1 Host Installation. The ERP developers, even if they are internal, must acquire authority from the host installation. This authority provides justification for requesting information from installation personnel, contractors, outside companies and agencies, as well as access to facilities. The “customer” for the ERP is the garrison commander and the persons that makeup the ERP development team should ensure contact and coordination with this individual or his/her designee. Typically, public works is the primary contact for the water system ERP though some installations are choosing to designate the DPTMS and/or the EOC Chief as the project contact person.

7.1.2 Notification. A formal notification letter should be sent to the installation at least 2 weeks before the onsite visit to ensure all necessary installation personnel can accommodate the assessment team. The notification letter should include the dates of the assessment, address security and facility access issues, and describe the assistance required. The letter must also stress installation involvement throughout the entire process. Full participation in ERP development, training, and subsequent tabletop and field exercises will be critical in the ability of an installation to respond and recover from a water system emergency and will be the difference between an ERP that collects dust on the shelf and a useful document.

7.2 PLAN DEVELOPMENT TEAM.

At least two plan developers should execute this plan. One of these personnel should have prior emergency response planning experience. More team members may be desirable given the complexity of a system and/or time constraints. At least one team member must have a secret or greater security clearance in order to review the water system vulnerability assessment that was conducted to comply with the *Public Health Security Bioterrorism Preparedness and Response Act* (reference 1). It is desirable for one plan developer to have conducted or participated in the installation’s water system vulnerability assessment since many of the same installation personnel will be contacted during ERP development.

7.3 PREVISIT ACTIONS.

7.3.1 Regulatory Format Requirements. ERPs developed for installation water systems must meet not only Federal and Army requirements but also State and local requirements. The plan developers must contact the State drinking water primacy agency as well as State and county emergency management agencies to determine whether or not water system ERPs must meet specific guidelines. Several states including California and Maryland required water supply emergency plans prior to the passing of the Bioterrorism Act (references 19-20).

7.3.2 Document Review. Team members should gather as much information about the water system and installation emergency response assets before the onsite visit. The following documents should provide a general structure for existing emergency response activities as well as information on water system assets. These include, but are not limited to:

7.3.2.1 Existing Installation Emergency Response Plan Resources.

- Biological, chemical, and nuclear accident and incident response and assistance (BAIRA, CAIRA, and NAIRA) plan.
- Radiological accident plan.
- Chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) plan.
- Unexploded ordnance (UXO) plan.
- Environmental disaster plan.
- Air release plan.
- Spill Prevention, Control, and Countermeasure Plan (SPCCP) as required by AR 200-1.
- Installation Spill Contingency Plan (ISCP) as required by AR 200-1 (reference 21).

7.3.2.2 Existing Water System Emergency Response Plan Resources.

- Water Resource Management Plan (WRMP) as required by AR 420-49.
- Water system emergency supply, contingency, and response plans as required by AR 420-49.
- Past water system incident reports and actions on file with the EOC.

7.3.2.3 Water System Operation and Maintenance Materials.

- Potable water system flushing plan.
- Water conservation plan as required by AR 420-49.
- Public Notification Plan as required by AR 420-49.

- Standard Operation Procedure (SOP) for alerting personnel in emergencies that clearly defines the duty of key individuals during the emergency as required by AR 420-49.

- Wellhead Protection Plan as required by AR 200-1.

7.3.2.4 Other Documents that Provide Useful Information.

- Classified water system vulnerability assessment.

- Most recent map of the entire water system showing all raw water sources, raw water transmission lines, WTPs, storage tanks, finished water piping, hydrants, major water suppliers, isolation valves, major buildings, critical customers, and neighboring interconnections in electronic and paper forms *(if this map is not present the plan developer must create this map for the ERP).*

- Water treatment facilities maps in electronic and paper forms.

- Personnel alert lists and logs.

- Copies of any Memorandums of Understanding (MOU) or Memorandums of Agreement (MOA) between private companies, municipalities, counties, or other government organizations to provide any type of support (water supply, emergency response, or medical) to the installation during an emergency. These include bottled water companies, other water systems connected to the installation water system, local or regional fire departments, and hospitals.

- Water distribution system maps showing major water mains, storage reservoir locations and capacities, as well as the building number and location of any child development centers, schools, hospitals, garrison headquarters, or other high-visibility or immuno-compromised populations.

- Electronic copy of any Geographical Imaging System (GIS) or AutoCAD data used to develop maps. This information should include files designating drinking water and wastewater pipes, roads, buildings, hydrants, and the installation boundaries.

7.4. ENTRANCE MEETING AND ONSITE ACTIONS.

7.4.1 Equipment and Supplies. The following items are recommended during an onsite ERP visit: laptop computer (with cables) and a cellular telephone to setup and double check appointments. Access to restricted sites (e.g., inside the EOC) should be coordinated by the ERP project team before the onsite visit.

7.4.2 Entrance Meeting. Prior to onsite arrival, the team leader and installation point-of-contact should coordinate the entrance meeting time, date, and location. This information should also be provided in the notification letter. Representatives from all organizations that could be involved in a water system emergency should attend the entrance meeting including assets within the installation boundaries, but also those within local municipalities, cities, and towns. The plan developers should meet and schedule interviews during the entrance meeting. If available, one plan developer should take detailed notes while the other presents the project and answers questions.

7.4.3 Entrance Meeting Outline. During the entrance meeting the team leader should follow the proposed outline shown below:

7.4.3.1 Introduction. Introduce the water system ERP team and thank representatives for attending.

7.4.3.2 Regulatory Requirements. Briefly mention the ERP requirement of the *Public Health Security Bioterrorism Preparedness and Response Act*, State, and Army Requirements.

7.4.3.3 Potential Attack Scenarios. Mention possible threat scenarios posed to the water system and resulting effect. None of this discussion should particularly reveal water system vulnerabilities identified in the classified vulnerability report.

7.4.3.4 Organizational Support. Discuss the potential number of organizations involved in an installation water system emergency.

7.4.3.5 Project Timeline. Talk about the project timeline (if included in the scope of work, propose when a tabletop meeting will be held to exercise the plan) and provide contact information. Answer questions and schedule interviews.

7.4.4 Handouts. Plan developers should provide the attendees' printouts of the PowerPoint slide presentation. In addition, a meeting sign-in sheet that lists the attendees' name, organization, telephone number, and email should be circulated around the room and collected. This sign-in sheet will be useful when setting up meetings and asking for information after the entrance meeting.

7.4.5 Onsite Actions.

7.4.5.1 Contact Information. Discussions with representatives from the public works and emergency response organizations prior to the onsite visit will be invaluable. Interviews should identify points-of-contact within the organization as well as the responsibilities and response equipment available during a water system emergency. All contact information (telephone numbers, email addresses, fax numbers, names, organization, city or town location as a guide) should be verified during the interview.

Questions outlined in the questionnaire in Appendix C can be used. It is common that during the interviews the ERP developers will realize that other persons not previously thought of should be contacted.

7.4.5.2 Organizations to be Involved. Plan developers should contact emergency response organizations on post (government, municipal, or contractor) that would respond to a water system emergency. Some of the organizations that should be contacted were provided in Chapter 3. Discussions with these organizations may direct the ERP team to contact other important organizations.

7.4.5.3 Off-post Support. Depending on the type of emergency, off-post organizations may be called in to provide support. Table 5 lists some organizations that may become involved. The team should get permission from installation staff to coordinate with any off-post entity. Neighboring organizations located outside the installation may be useful in an emergency support situation and should be contacted by the plan developer or an installation representative to determine their ability to assist during a water system emergency.

Table 5. Off-Post Local, State, and Regional Organizations to Contact

Organization Type	Name
Emergency Responder	FBI Field Office / WMD Team Regional WMD Civil Support Team Local Police Department Local Fire Department Local Public Works Department Local and Regional Hospitals Health Departments Local and Regional Laboratories State Drinking Water Program
Emergency Management	Local / County EOC Local / County / State EMA Office FEMA Office
Recovery	Local Red Cross Office Local and Regional Military Water Production Teams Bottled / Packaged Water Co. Sanitation Vendors (e.g., Portable Chemical Toilets) Heavy Construction Contractors Ice and Refrigeration Vendors
Equipment and Supply	Pumps, Pipes, Parts Suppliers Plumbers Chemical Suppliers Local Street, Road, and Highway Department Local Water Treatment Plants Local Wastewater / Storm Water Utility

7.4.5.4 Formal Support Agreements. Plan developers should search for any existing MOAs or MOUs to determine if a support plan exists between the installation and external organization to provide support during an emergency. Typically, plan developers have found that there are many verbal agreements to come to the aid of the installation during an emergency but no formal ones. This information needs to be determined by the plan developers. If no agreements are in place, ERP report developers should recommend in the project summary report that they be formalized.

7.4.5.5 Neighboring Water Systems. The plan developers must determine if neighboring water system connections exist. For instance, many Army water systems have been connected to a neighboring water system at one time with a mutual aid agreement. Over time, however, these connections have been severed (due to new construction). In many cases, the connections were never reinstated unbeknownst to the public works. This type of information needs to be determined during the water ERP project and should not be left up to the first responder during a full-scale emergency. Also, the potential to create a new interconnection should be examined.

7.4.5.6 LEPC. As outlined in the *Bioterrorism Act,* "community water systems shall, to the extent possible, coordinate with existing Local Emergency Planning Committees when preparing or revising an emergency response plan." Plan developers should contact the installation emergency services and determine whether or not the LEPC is involved in the emergency planning process. LEPCs should be contacted by the team if drinking water is produced on post and sold to a community outside the installation boundaries. A listing of more than 3,000 LEPCs as of October 2003 can be found at http://www.epa.gov/ceppo/lepclist.htm.

7.4.5.7 Vulnerability Assessment. Team members must review the water system vulnerability assessment to identify the highest risk scenarios. Response actions will need to be included in the ERP to address these scenarios. Without revealing vulnerabilities, the plan developer should outline, with the help of the installation representatives, what actions need to be taken to respond to and recover from the event (e.g., failure of raw water line, loss of electrical power, failure of storage tank). The most important factor of integrating the vulnerability assessment is not the vulnerability itself, but how to respond if the vulnerability is exploited. The incorporation of the vulnerability assessment findings into the ERP can be accomplished by considering the following scenarios: physical destruction or loss of an asset, intentional contamination of the water system, and a cyber attack against the water system. An acceptable action to any of these scenarios can be broken into three main tasks: (1) response (crisis management), (2) recovery (consequence management), and (3) remediation (consequence management). The installation military intelligence (MI) or Force Protection (FP) office is likely to know the location of the water system vulnerability assessment.

7.4.5.8 Information Verification. All emergency response organizations' contact information (telephone numbers, email addresses, fax numbers, names) should be verified by the plan developers. Many installation personnel who will or have been

involved in a water system emergency use personnel alert lists. The ERP team should obtain copies of these lists and incorporate accurate and up to date lists into the water system ERP.

7.5 MATERIALS ACQUIRED AND PROJECT NOTES.

Materials used to develop the ERP should be handled using “For Official Use Only” (FOUO) classification guidance unless specific guidance is provided by the installation. Working ERP drafts should also be handled FOUO. Any files, documents, or information acquired should be guarded as it may contain personal contact information (e.g., home addresses, telephone and pager numbers).

7.6 ERP DEVELOPMENT AND REVIEW.

7.6.1 Classification. The ERP should include all items explained in Chapter 8 and be labeled “FOUO.” The ERP should not become a secret document because it will be unavailable to frontline emergency responders. If the ERP is classified as a secret document, the plan developers should remove information that causes document classification.

7.6.2 Review and Exercise. At a minimum, once the plan is drafted, all major response organizations should review the plan to verify or correct their roles and contact information. Ideally, an exercise could be conducted to help determine the usefulness of the ERP. Exercises are not required to comply with the Federal law but are highly recommended by the USACHPPM and the EPA. Chapter 9 describes these exercises.

7.7 FINAL PROJECT MEETING.

If requested by the installation, a final project meeting can be coordinated and scheduled. Any organizations or persons that wish to attend the final project meeting, who did not attend the entrance meeting, should be directed to contact the ERP installation point-of-contact. During the final project meeting the team leader can follow the event sequence shown below.

7.7.1 Introduction. Introduce the water system ERP team, thank representatives for attending, and discuss the entrance meeting.

7.7.2 Regulatory Requirements. Briefly mention the ERP Federal, State, county, and Army requirements.

7.7.3 ERP Outline. Give an overview of the ERP outline (provide clearly labeled final copies to the attendees).

7.7.4 Provide Scenario/Review Exercise. Provide a brief scenario and ask the attendees to determine a response sequence using the information in the developed ERP. Review lessons learned from conducting the exercise.

7.7.5 Question and Answer. Answer questions.

7.8 PROJECT DELIVERABLES AND TRANSMITTAL.

The final ERP document should be provided to the installation point-of-contact in electronic form via compact disk and in paper form. In addition, a transmittal memorandum should accompany the ERP along with a short 5-10 page report. The short report should be provided with the transmittal letter and ERP document. This short report should contain a brief summary of important information and identify future actions the installation should take to better prepare them for responding to a water system emergency.

Chapter 8
Critical Information for an Emergency Response Plan

8.1 INTRODUCTION.

This guidance is based on proposed ERP outlines distributed by the Association of State Drinking Water Administrators (ASDWA), EPA, and National Rural Water Association (NRWA) as well as some State drinking water and emergency management agencies. Existing ERPs for several municipal water systems were also used in the development of this guide. While this TG is helpful, plan developers must still contact the State drinking water primacy agency and determine if the State requires certain agencies to be contacted under emergency conditions. An example ERP outline is provided in Appendix D.

8.2 REGULATORY REQUIREMENTS.

An ERP includes a brief discussion about the regulatory requirements and policy. The following regulations apply to Army water systems: Safe Drinking Water Act (SDWA) as amended by United States USPL 107-188, State and County Codes (if applicable), and AR 420-49.

8.3 POLICY.

8.3.1 Mission. The ERP's policy section defines the mission of the water system and describes general emergency response guidelines. During an emergency response, the main missions are to continue minimum service levels, mitigate the public health risks from drinking water contamination, provide reliable water service, and minimize public health risks from unsafe drinking water. Drinking water systems must not only provide potable water for drinking and sanitation purposes, but they also support fire-fighting operations and industrial activities.

8.3.2 Types of Emergencies. The ERP defines what types of emergencies and/or disasters are likely to affect water system operation. Specific disasters that the water system may experience are described in Chapter 2 and should be listed in this section. This information will help responders understand how the water system may be affected.

8.3.3 Additional Response Resources. The ERP includes an inventory of system resources available for emergencies. This inventory includes maps and schematic diagrams of the water system, and lists of emergency equipment, equipment suppliers, and emergency contract agreement(s). Plan developers can gather much of this information from various individuals and organizations (public works, logistics, operations and maintenance, and PVNTMED).

8.3.4 Coordination. Coordination procedures with Government agencies for health and safety protection; technical, legal and financial assistance, and public notification should also be explained in the water system ERP. Typically, this information is described under the notification and reporting section.

8.3.5 Response Actions and Reporting. The ERP describes basic response guidelines. For example, personnel will, as quickly as possible, determine the status of other employees, assess damage to water system facilities, provide logistics for emergency repairs, monitor progress of repairs and restoration efforts, communicate with health officials and water users according to this plan, and document damage and repairs. The plan also describes steps that will be taken to resume normal operations and to prepare and submit reports to appropriate agencies. Response guidelines for identifying the nature of the emergency are very important and must be explained along with procedures for reporting potential water system emergencies.

8.4 CONCEPT OF OPERATIONS AND NOTIFICATIONS.

Information must be provided to the installation on what constitutes formal initiation of the ERP and who is responsible for this act. Specific actions for responding to threats and investigating possible incidents are necessary in an ERP. The following guidelines can be used in the water ERP.

8.4.1 Notifications. When there is indication of a threat to the water system (natural or manmade), plans will be reviewed and coordination effected to ensure orderly execution. Upon coordination with the Command Group, the EOC initiates notification schemes to ensure distribution of the information relative to the potential threat.

8.4.2 Response to Natural and Routine Water System Emergencies. Natural and routine emergencies can typically be handled by installation resources alone. These types of emergencies include severe weather such as hurricanes, tropical storms, and tornadoes as well as water line breaks and unintentional bacteriological contamination of the water system. During an emergency, public works will notify law enforcement, the installation operations center, and the PVNTMED about potential health and operational impacts of the ongoing emergency and response. If an emergency cannot be handled by installation resources, the public works will request response support through the EOC.

8.4.3 Response to Manmade Water System Emergencies. Any manmade water system emergency should be investigated by the public works in conjunction with law enforcement, the EOC, and the PVNTMED. Suspected or confirmed water system threats or attacks can have secondary consequences and can include the use of secondary explosive devices. A unified approach to investigating these threat warnings should be taken. The decision logic illustrated in Figure 2 should be used when investigating a threat warning.

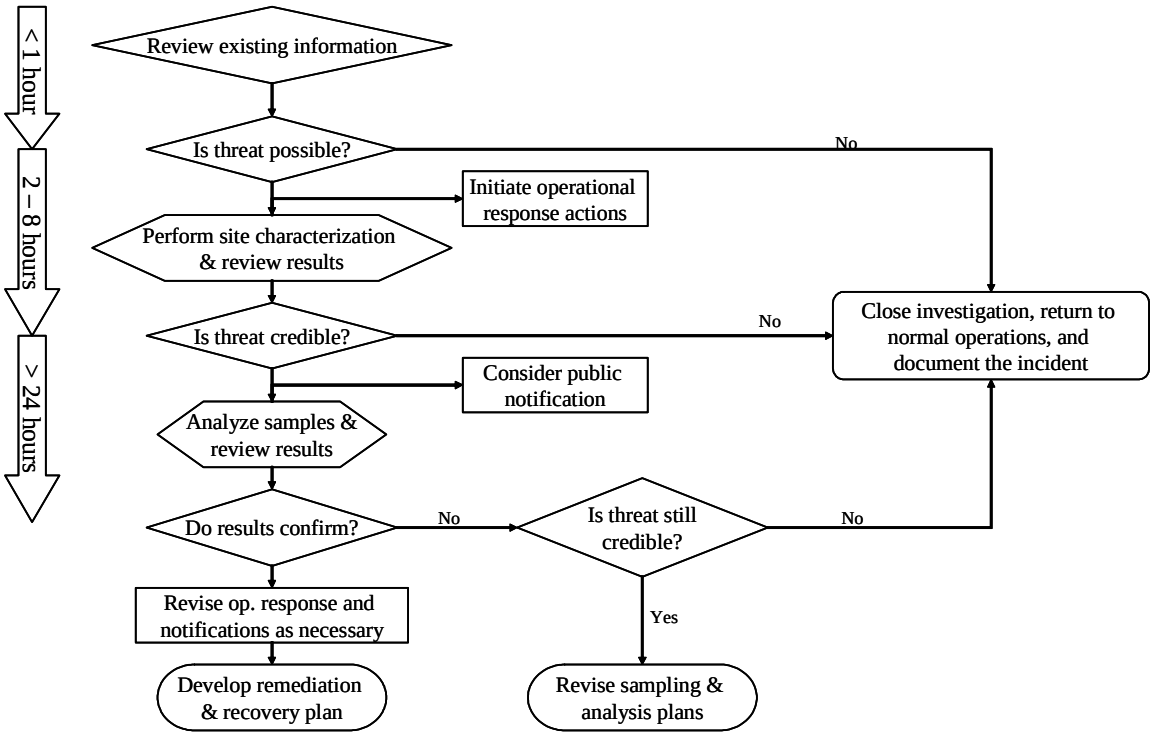

Figure 2. Decision Logic for Investigating Threat Warnings

8.4.3.1 Possible. Within 1 hour of discovering a threat warning, the public works, law enforcement, EOC, and PVNTMED should meet to discuss the potential problem and determine whether or not the threat is possible. A threat is characterized as possible if the circumstances of the threat warning appear to have provided an opportunity for contamination. If determined to be possible, the public works should notify, if they have not done so already, local law enforcement, the State drinking water agency, and alert staff and personnel about the threat warning.

8.4.3.2 Credible. Within 8 hours of receiving the threat warning, the public works, law enforcement, EOC, and PVNTMED should determine if the threat is credible. A threat is credible if information collected during the threat evaluation process corroborates with information from the threat warning. If determined to be credible, the public works should consider isolating wells and portions of the water system by closing valves, shutdown the system and provide alternate water, and conduct testing recommended by monitoring and sampling experts.

8.4.3.3 Confirmation. Within 24 hours of receiving the threat warning, the public works, law enforcement, EOC, and PVNTMED should determine if the incident has been confirmed. Incidents are confirmed if the information collected over the course of the threat evaluation provides definitive evidence that the water system has been attacked and/or contaminated. If confirmed, the EOC should execute formal notifications and request support as necessary.

8.5 RESPONSIBILITIES.

Responsibilities of garrison organizations should be outlined in the ERP similar to those described in Chapter 6. Responsibilities of tenant organizations on post as well as those external to the installation that can also provide emergency support equipment and technical assistance should be listed too. At a minimum, contact information for external support organizations should be included in the ERP.

8.6 REPORTING REQUIREMENTS.

8.6.1 General. The best defense against terrorism is to be alert and watchful for suspicious acts and personnel, particularly those carrying suitcases or other containers. Unidentified and/or abandoned vehicles, suitcases, and parcels near water facilities should be reported to public works and military police. Suspicious fire hydrant connections and running water originating from buildings should also be reported to public works and military police. Unusual signs or symptoms of illness should be reported to the local medical authority (e.g., PVNTMED). If the IC in coordination with public works and PVNTMED determine that the water system could be contaminated, response actions will be taken to further investigate the source, isolate the affected distribution system, cleanup, store, and dispose of the affected materials as well as the return of the water system to service.

8.6.2 Water Emergency Determination. The garrison commander, or designee, has the authority to declare a water system emergency. Public works is responsible for recommending the declaration of a water system emergency to the garrison commander. Public works should determine if support from the EOC, law enforcement, and PVNTMED is required for the response. A confirmed water system contamination event is considered an emergency.

8.6.3 Incident Reporting. Upon the declaration of a water system emergency, the EOC should promptly notify the required organizations. Public works is primarily responsible to make certain that the organizations on post which are needed for the water system response are notified. A copy of all written reports submitted to Federal, state, or local regulators should be forwarded through the Chief, PAO representative at the EOC for approval. Notification of the following organizations should be considered if a water system emergency is declared: local health department, State drinking water agency office, regional EPA office, U.S. Army Installation Management Agency (IMA) Regional Office, National Response Center (NRC), and U.S. Army Major Command HQ Office (e.g., FORSCOM and AMC). If the water system has been attacked, all of the aforementioned organizations should be notified.

8.7 INSTALLATION AND WATER SYSTEM OVERVIEW.

8.7.1 General Information and Directions. This section should include information specific to the water system, including the public water system (PWS) ID number, system owner and contact information (name, title, organization, branch, work

commercial telephone number, DSN, home telephone number). Directions to the installation and water plant from locations north, south, east, and west of the installation should also be provided (preferably in an appendix). Prewritten directions will be invaluable during emergency responses that involve agencies external to the installation. Other information that should be included is the location of the water system to include the name of the installation, city, state, country or territory, and latitude and longitude locations of the installation.

8.7.2 Populations and Customers Served. The ERP should include a brief discussion about the type and number of people served by the system. If applicable, the population reported should include the population the water system is permitted to serve and also an estimate of the number of training Soldiers stationed at the installation. The number of service connections should also be listed in this section.

8.7.3 Critical Customers. Names and locations (building numbers) of critical customers such as child development centers, dental clinics, hospitals, dependant towns, cities, and connected communities should be provided in this section. This information should allow emergency responders to quickly determine if these populations are at risk based on preliminary findings. Locations of buildings with critical customers should also be annotated on a map that accompanies the water ERP.

8.7.4 System Description. The ERP should describe all existing water system facilities and backup equipment. Maximum and average production capacity per day per WTP should also be indicated. Building numbers should be noted where mentioned facilities exist. Specific facilities include the WTPs, raw water sources, intakes, and transmission lines, mechanical and chemical treatment processes, distribution system piping and storage infrastructure, chemical usage and storage, pumping facilities, and local laboratory capabilities. Process flow schematics are particularly helpful and should be developed using a tool such as Microsoft PowerPoint. Existing water storage capacity to include full water volume, empty elevation, and full elevation should also be provided.

8.7.5 Chemical Treatment Information. Information on each chemical that is used and stored in water plant facilities should be accessible to emergency responders in the ERP. Specific data that should be included: chemical name, storage location, purity, quantity, vendor name, and vendor contact information. Material Safety Data Sheets (MSDSs) should be included in the appendix section of the ERP. These data sheets will be a critical resource to emergency responders during water system contamination or a chemical feed/building physical destruction incident. If MSDSs are not available onsite, the chemical supplier and/or manufacturer should provide them.

8.7.6 Priority-of-Service List. Water demand on an installation will tend to increase at the onset of a disaster or emergency. Reasons for this include fire-fighting efforts, ruptured water mains, and water collection for storage. The priority-of-service list should prioritize organizations, units, and/or buildings that require water service during an emergency. A priority-of-service list should be drafted by the plan development team

and provided to the installation Command for review. The following points should be considered when developing a priority-of-service list: (1) potable water for survival, (2) mission essential water requirements, (3) critical facility water requirements, (4) special unit water requirements, (5) housing/barracks requirements, and (6) general installation water requirements.

8.7.7 Maps. The ERP should include maps of the water system. Water system maps should show all water lines (raw and potable), fire hydrants, control valves, and interconnections with other water systems connections as well as major treatment, pumping, and storage buildings. Roads and buildings are also helpful to responders as they can be used as a guide. The locations of surface water bodies (e.g., lakes and rivers) and other natural features are also helpful, especially if a do not use order is issued and water in the lines cannot be used for fire-fighting purposes. If maps are not present at the time the ERP project is conducted they should be developed by the plan development team.

8.8 ALTERNATIVE POTABLE AND NONPOTABLE WATER AND ICE SOURCES, REFRIGERATION AND SANITATION FACILITIES.

8.8.1 General. Depending on the extent of the emergency, safe drinking water and the facilities it supports may not be available. The denial of water affects not only drinking and washing but also waste disposal and fire-fighting. The ERP should consider responses for these uses during emergencies. Installation public works and logistics offices should have information concerning the acquisition of emergency supplies.

8.8.2 Drinking Water Required. The installation water supply should be considered at a critical level when the quantity of stored water is equal to or less than the fire-fighting demand and there is no additional water production available. If installations were to reach critical water levels, water restrictions should be implemented. Restrictions should only be maintained for as long as is absolutely necessary to allow the distribution system to come back online. A short brief table should be included in the water system ERP which identifies the amount of water required (in gallons) at normal operating capacity for the service population over 1, 5, and 7 days. This table should provide installation personnel quick answers to questions involving how the population is affected by an emergency event. In addition, the estimated volume of water required should include unaccounted for workforce personnel and units training on facility grounds. Estimated water required should include drinking water, water for sanitation and washing, and water used in food preparation. The Army Corps of Engineers (COE) estimates that 5.0 liters will be used per person per day under emergency situations for drinking purposes. Water conservation plans should be consulted as they sometimes estimate installation water usage requirements.

8.8.3 Drinking Water Alternatives.

8.8.3.1 Neighboring Water Systems. Water systems located in communities surrounding the installation should likely be the first alternate source considered by the installation. Many installations have informal verbal agreements with public or private water suppliers located adjacent to post, while others have established MOUs or MOAs with neighboring water systems. Formal agreements such as MOUs and MOAs should identify how much water can be provided to the installation under emergency conditions. This information should be obtained by the plan developers and described in the ERP. Water from neighboring systems can be provided via interconnections or pumped directly into water transport vehicles. During a regional water shortage event or if demand of the installation is greater than available production of local treatment plants, local water systems may not be able to compensate for the installation demand. In that case, other sources should be considered. The status of the subject interconnection should also be investigated. At one installation visited by USACHPPM, the interconnection was removed by a contractor because of construction in the area and the public works was unaware of this.

8.8.3.2 Installation Assets. This section should also include a description of available U.S. military water production units. This description should identify the type and quantities of field water production and storage equipment on the installation as well as the owner of the equipment. A brief description of emergency drinking water production and storage assets used by the military are listed in Tables 6 and 7. Figure 3 provides a process flow schematic for the Army's ROWPU.

8.8.3.3 External Army Resources. In addition to local installation resources, typically the State National Guard units have field water supply equipment available in the event of an emergency. The COE should also have these resources available and are the lead for public works during national emergencies as classified in the Federal Response Plan (FRP) (reference 22).

Table 6. Military Water Production Equipment Overview

Asset Name	Descriptive Information
Reverse osmosis purification unit (ROWPU)	Multistage water treatment unit capable of treating all qualities of water (Figure 3). Available as 600 gph 1,500 gph, and 3,000 gph[1]. Cannot be directly connected to wells. Can draw from undamaged storage tanks. Equipped with granular activated carbon (GAC) and ion exchange units for treatment of nuclear, biologically, and chemically (NBC) contaminated water.
1,500-gph Tactical Water Purification System (TWPS)	Fully contained mobile water purification system; incorporates multimedia and cartridge filtration prior to RO treatment; equipped with GAC and ion exchange units for treatment of NBC contaminated water.
125-gph Lightweight Water Purifier (LWP)	Highly mobile and purifies from both fresh and saltwater sources; weighs less than 2,000 pounds, for transport by High Mobility Multipurpose Wheeled Vehicle (HMMWV) and also UH-60 helicopter.

gph represents gallons per hour

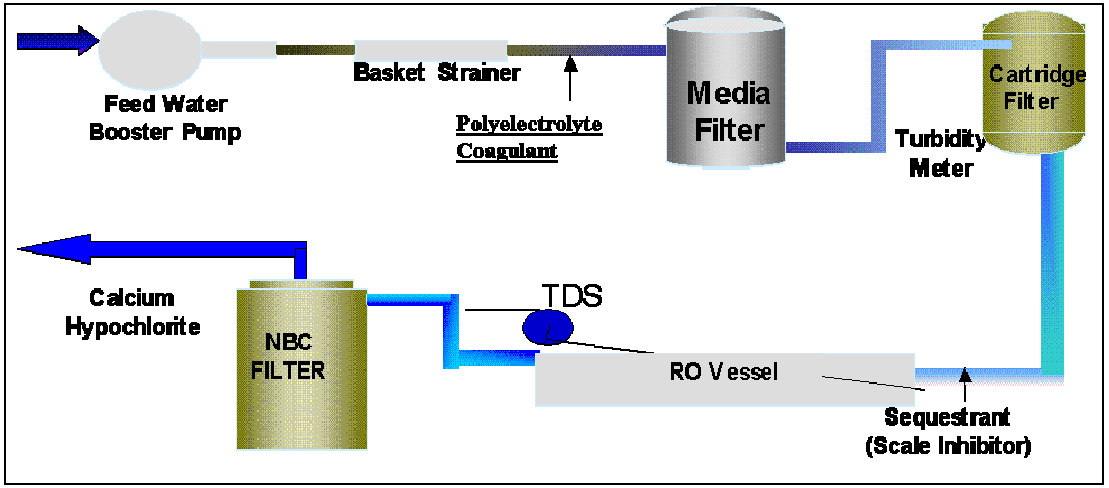

Figure 3. ROWPU Process Flow Schematic

Table 7. Military Water Storage and Distribution Equipment Overview

Asset Name	Descriptive Information
Semi-Trailer Mounted Fabric Tank (SMFT)	Transports drinking water; a collapsible tank with pressure gage, end-fittings, tie down straps, emergency repair items, hose, and tools to secure the tank safely to the trailer; can only be transported full or empty; 3,000- and 5,000-gallon capacities.
Potable Water Storage and Distribution System (PWS/DS)	Total capacity will be dependent on the number and size of fabric tanks utilized; each capable of receiving and distributing water, both hose line and tank truck; water issued to tank trucks, water trailers, forward area water point supply system, or small unit containers; likely used for long-term water supply operations.
Forward Area Water Point Supply System (FAWPSS)	Portable, self-contained, and diesel-operated which dispenses potable drinking water; operated by a 125-gpm centrifugal pump; six 500-gallon water storage and dispensing drums are attached; drums provide water to the 125-gpm pump, which, through hoses and valves, pumps water to four distribution nozzles where the water is discharged.
Tactical Water Distribution System (TWDS)	Easily transportable water transport system consisting of pumping stations, storage assemblies, and distribution points; designed to distribute water up to 10 miles on level terrain.
Water Distribution and Waste Management System (WD/WMS)	Composed of three modules; primary means for the receipt and storage of bulk potable water, and for wastewater management for the Deployable Medical System hospital; total capacity of each unit is dependent on the size of fabric tanks used (usually 18,000-20,000 gph)
Load Handling System Water Tank Rack (HIPPO)	Not yet fielded but will consist of a 2,000-gallon, hard-walled, water tank rack with an integrated water pump.
3,000-gallon Onion Tank	Easily transportable, manually inflatable/collapsible fabric water tank; packaged, the tank weighs 130 pounds, but filled with water, the tank weighs 25,020 pounds.
400-gallon Water Trailers (a.k.a. Water Buffaloes)	M149A2 is a stainless steel tank; M1112 water trailer is a newer eight-wheeled water trailer, which has a cylindrical stainless steel tank and a wider footprint that makes it more stable during movement.
900-gallon CAMEL	Not yet fielded but will replace the M149A2 and M1112 water trailers and has two 450-gallon pods, an integrated heater/chiller, and filling stands for individual soldiers - all on a trailer platform.

gpm represents gallons per minute; gph represents gallons per hour

8.8.3.4 Bottled Water Suppliers. There is no Army, State, or Federal regulatory requirement that calls for the issuance of bottled water under emergency conditions. However, alternate water supplies such as bottled water may be needed if a “Do Not Drink” or “Do Not Use” order is issued. Local bottled water suppliers may be good sources of emergency water. On Army installations, the Army and Air Force Exchange Service (AAFES) is a good local source for small quantities of bottled water. If bottled water suppliers are identified, contact information to include point of contact (POC) name, title, organization, work telephone number, DSN, and home telephone number as well as city and State are necessary. Typically, the organization responsible for logistics on post will have food service contracts in place for these types of emergencies. To ease the logistical difficulties of mass distribution and storage burden during an emergency, it is preferred that individuals store their own bottled water.

8.8.4 Nonpotable Water (Fire-fighting). If a “Do Not Use” order is issued the use of fire hydrants will be prohibited because of the potential to spread contaminated water. As a result, other water sources will need to be relied upon. These sources include neighboring fire departments, as well as swimming pools and surface water sources (e.g., lakes and rivers). These sources need to be identified in the ERP, to include quantities and locations.

8.8.5 Ice and Refrigeration Facilities. Vendors that sell and lease ice and refrigeration facilities (used to keep this ice cold) should be listed in the water ERP. Ice and refrigeration facilities are often overlooked in emergency planning but are necessary during disaster events. The installation logistics organization, specifically food services, would likely have contact information for local ice and refrigeration vendors.

8.8.6 Sanitation Facilities. The issuance of a “Do Not Use” order would prohibit the use of toilets on an installation. Likely, nonresidents of the installation would be dismissed; although, in the absence of sanitation facilities, portable toilets will need to be acquired for permanent residents. The ERP should provide a list of vendors for these units if a contract is not already established.

8.9 EMERGENCY NOTIFICATION LISTS.

The ERP should include internal and external notification lists. Additional support organizations that should be listed are equipment and supply resources (vendors), local and regional law enforcement and emergency response units (e.g., local health department, FBI, EPA, state response team, WMD CST), technical assistance resources (e.g., USACHPPM), and local emergency management agencies.

8.10 EMERGENCY EQUIPMENT AND SUPPLIES.

8.10.1 Equipment Inventory. All equipment that can be used during response and recovery operations should be listed and described (quantity, size, volume, length and weight). Organizations listed in Table 8 should be contacted to determine if repair, water production, water storage, transport, earth moving, power sources, or lighting can be provided.

Table 8. List of Equipment to be Included in the ERP[1]

Organization Name	Description of Typical Equipment Available
Water System Operations and Maintenance	Piping (material, lengths, sizes), valves (material, lengths, sizes), hydrants, clamps (material, lengths, sizes), generators (capacity), backup/extra chemical feed systems (types), chemicals typically in storage (quantities, types), spare pumps (capacity)
Fire Department	Fire engines (types, water holding capacity), extra hose line (lengths, sizes)
Grounds Maintenance	Backhoes (types), front-end loaders (types), pump trucks (sizes), vacuum trucks (sizes), jet roder trucks (sizes), scoop loaders (sizes), road graders (sizes), steam rollers (sizes), cranes, dump trucks, portable construction lights, generators
Logistics / Water Production and Storage Team	ROWPUs (capacity), water trailers (capacity), SMFTs (capacity), PWS/DS, extra hose line (sizes, lengths), bottled water (in stock), tanker trucks (capacity), radios/communications
Police	Portable lights(capacity), generators(capacity)

[1]Quantities of each type of equipment available should be noted.

8.10.2 Chemical and Equipment Vendors. Contact information for all water system equipment and chemical supply vendors should be provided in the ERP. During an emergency, one or more chemicals or types of replacement equipment may be needed. This list will provide the installation a quick and concise listing of vendors for the desired chemical or piece of equipment. Information that should be provided includes the company name, telephone number, city, State, and type of equipment support available. This information can be obtained from the water system manager and/or Contract Officer Representative (COR) and water system manager.

8.11 EXAMPLE FORMS AND SHEETS.

The ERP should include example forms and sheets. This information will be helpful in developing public notification statements and communicating during the emergency. Examples of the following are provided in Appendix E.

8.11.1 Communications Log Sheet.

8.11.2 Telephone Threat Record Sheet.

8.11.3 Sample Chain-Of-Custody Form.

8.11.4 General Message Form, ICS Form 213.

8.11.5 Initial News Release.

8.11.6 Water Shutoff Notification Form.

8.11.7 "Boil Water" Advisory Press Release.

8.11.8 "Do Not Use" Order Press Release.

Chapter 9
ERP Training and Exercises

9.1 FAMILIARIZATION, REVIEW, AND REHEARSALS.

9.1.1 Familiarization. Once the water system ERP is developed, Army installations should ensure that each organization involved in an emergency event obtains a copy of the ERP and understands their roles and responsibilities.

9.1.2 Review and Rehearsals. The ERP should be reviewed and rehearsed at least annually as recommended by the EPA (reference 7). Periodic rehearsals are necessary especially since many management teams of Army water utilities are moving towards privatization. Privatization of an Army water system will require updates to the ERP as POCs will have changed.

9.2 TRAINING EXERCISES.

9.2.1 The Next Step. A water system ERP will help emergency responders during a water system emergency. Although, since the ERP is only a plan, all installations are strongly encouraged to conduct either a tabletop or field exercise after the plan has been developed. No plan is a good plan unless it has been tested and improved. Several water systems around the U.S. have conducted water emergency exercises.

9.2.2 Exercise Scope. Exercise execution should either include a meeting dedicated solely to reviewing the water system ERP or the execution of either a tabletop or field exercise with all organizations participating. An excellent exercise of the plan would include inviting representatives from the local FBI, State drinking water agency and health department, EPA field offices, and local emergency services.

9.2.3 Exercise Design Guidance. Guidance on executing tabletop exercises can be obtained from the installation EOC as well as the HQ USACHPPM Water Supply Management Program at Aberdeen Proving Ground, MD. The USACHPPM highly recommends that a response to an intentional contamination event be included in the exercise.

9.2.4 After Action Review. An AAR should be conducted after each exercise. This review provides participants an opportunity to identify useful information in the ERP as well as recommend changes to improve the response effort. The AAR emphasizes player input to determine what happened, why it happened, and how it can be done better. AARs are player-conducted events with evaluator comments and input as a secondary by-product. Public works should publish the results of the AARs (e.g., in the form of a memorandum). These reports should be furnished to all participants in the

subject exercise. Objectives of subsequent exercises should be based upon command guidance, previous incidents results, and the results of the last exercise to make certain that training weaknesses are identified and corrected. Additionally, each organization should track improvements, changes, and corrections based on lessons learned cited in the AARs. Public works is usually the organization responsible for tracking improvements, changes, and corrections on the water ERP based on lessons learned cited in AARs.

APPENDIX A

REFERENCES

[This page was intentionally left blank.]

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18. USACHPPM. May 2003. *USACHPPM Technical Guide 284, Drinking Water Consumer Complaints: Indicators form Distribution System Sentinels.* Prepared by A.J. Whelton. Aberdeen Proving Ground, MD, USA.

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20. Title 26, Subtitle 04, Chapter 01.22, Code of Maryland Regulations (CMR), 2002, Emergency Plan Provisions.

21. AR 200-1, April 1997, Environmental Protection and Enhancement.

22. Federal Emergency Management Agency (FEMA). *Interim Federal Response Plan*, Updated January 2003. Washington, D.C.

APPENDIX B

EPA ERP CERTIFICATION LETTER

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CERTIFICATION OF COMPLETION OF AN EMERGENCY RESPONSE PLAN

Public Water System Identification Number: _____

Water System Name: _____

City Where Water System Is Located: _____

State: _____

Printed Name of Person Authorized to Sign
this Certification on Behalf of the Water System: _____

Title: _____

Address: _____

City: _____

State and ZIP code: _____

Phone: _____ Fax: _____

Email: _____

I certify to the Administrator of the U.S. Environmental Protection Agency that this community water system has completed an Emergency Response Plan that complies with Section 1433(b) of the Safe Drinking Water Act as amended by the *Public Health Security and Bioterrorism Preparedness and Response Act* of 2002 (Public Law 107-188, Title IV—Drinking Water Security and Safety).

I further certify that this document was prepared under my supervision. I am aware that there are significant penalties for submitting false information (Safe Drinking Water Act (42 U.S.C. 300f *et seq.*)).

The emergency response plan that this community water system completed incorporates the results of the vulnerability assessment completed for the system and includes “plans, procedures, and identification of equipment that can be implemented or utilized in the event of a terrorist or other intentional attack” on this community water system.

The emergency response plan also includes “actions, procedures, and identification of equipment which can obviate or significantly lessen the impact of terrorist attacks or other intentional actions on the public health and the safety and supply of drinking water provided to communities and individuals.”

This CWS has coordinated, to the extent possible with existing Local Emergency Planning Committees established under the Emergency Planning and Community Right-to-Know Act (42 U.S.C. 11001 et seq) when preparing this emergency plan.

Signed: _____ Date: _____

Primary Contact Person that the EPA can Call if there are any Questions

Name: _____

Address (if different than that of the authorized representative):

_____

Phone: _____

Email: _____

Alternate Contact Person

Name: _____

Address (if different than that of the authorized representative):

_____

Phone: _____

Email: _____

APPENDIX C

INTERVIEW QUESTIONNAIRE FOR EMERGENCY RESPONSE PLANNING TEAM

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General

Has your water system ever had a potable water emergency caused by either a natural disaster (e.g., hurricane), vandalism, unintentional bacteriological contamination (positive coliforms), or attack? If so, please describe. What was your involvement? What was the involvement of other organizations that responded/took part in the effort (on and off post)?

Since the water vulnerability assessment, what actions were taken to better fortify the military water system and prepare for terrorist attacks?

What would your role be if a water system asset were destroyed? Contaminated? Attacked by cyber networks? Who would you contact if a water system emergency occurs?

What do you know about the water system? Have you ever visited the water treatment plant? Storage tanks? Other water facilities? Do you know where all of the water facilities are located? Including those off post?

Who would contact you if you suspected either contaminated drinking water, a reduction in water pressure, or water with a peculiar taste, odor, color, or texture?

Have you ever been asked to assist in the response to a water system problem?

How many years have you been in your field? In your current position? At your present employer?

Who has the authority to shutdown the water system and declare a “Do Not Use” order?

Training

Have law enforcement, security and the local emergency responders previously discussed how they would respond to a water system terrorist attack? Have there been any tabletop or field exercises?

Have you heard of/reviewed the U.S. Environmental Protection Agency (EPA) Contamination Threat Management Guide developed for responding to suspected or confirmed water system contamination?

Will an Incident Command System (ICS) be initiated during an emergency? Have you been trained on the ICS? Has the Directorate of Public Works (DPW) Chief?

Are water system manager, chiefs, DPW chiefs and managers, as well as the Preventive Medicine (PVNTMED) Chiefs aware of their responsibilities and duties in the ICS?

Is there a water system threat record sheet? Have you ever been trained on how to handle telephone threats? (Preferably by the police)

Existing Water System Emergency Response Plans (ERP) and Standard Operating Procedures (SOP)

Does the DPW and or emergency operations center (EOC) have a water system ERP? Have you ever seen it? If you could change add/delete one part of the existing ERP what would it be?

Where is the EOC located? Who's in charge of the EOC if it is activated? How is the EOC activated and who's responsibility is this?

Do you know if there is an emergency notification list for notifying the necessary personnel? Internal? External? How often is the call-list updated? Who is in charge of its update?

Do you have names and working telephone numbers of chemical suppliers?

How are drinking water customer complaints handled currently? Does PVNTMED receive them? Work Order Desk? DPW? Fire Department? Some or all of the mentioned? Are the recorded and reported to a single point-of-contact who is charged with tracking their frequency, occurrence, and investigation?

What "written" SOPs are in place that would help water system, PVNTMED, etc., personnel respond to a water system emergency?

Detection of Contamination

Do you have a plan in place to protect water facility assets in heightened THREATCON/ FPCON posture? Are these assets on the mission essential vulnerable assets (MEVA) or high-risk target (HRT) lists?

Is monitoring of the water system increased when THREATCON/FPCON levels increase? (e.g., water sampling frequency, patrols, and onsite investigations of customer complaints)

What laboratories are used to conduct routine bacteriological and chemical analyses for the water and wastewater system? Do you know what the capabilities of those labs are (e.g., list of contaminants they can detect)? Are these laboratories open 24 hours a day, 365 days per year? What happens if the emergency occurs on a holiday or weekend?

Are there any backup laboratories identified?

Have you ever been given a drinking water customer complaint? (e.g., taste, odor, color, clarity)? How do you handle it? Who do you report it to? Did/do you take water samples when you investigate?

Is there one central location for tracking and mapping ALL customer complaints? If no, how can it be implemented?

Have you read the USACHPPM Technical Guide 284 on how to better investigate and track customer complaints as indicators of water system contamination?

Response Equipment, Supplies, and Resources

Do you have any equipment, supplies, or resources that would be useful during an emergency? What equipment do you have available onsite if an emergency occurred? (SCBAs, earthmovers, generators, pumps, sampling bottles, etc.)

What quantity and types of water plumbing equipment and chemical supplies or on stock regularly? Is there a water system supplier contact list available?

Contingency Water Supplies for Potable and Nonpotable Purposes

Is there a connection with the post water system to a public or private water system off-post? Has it ever been used? Have you ever physically opened/tested the valve?

Are there any reverse osmosis water purification unit (ROWPU) teams or possible military units that can treat, store, or distribute contingency drinking water supplies located on post? In the local community?

If you can supply water during an emergency, what quantity can you provide per day? On a short- or long-term basis?

If you can transport/store water in an emergency, how much water can you transport and/or store per day? How many vehicles and storage units do you have available?

What are the names of some local surface water sources located near or in the post? How far are they from post?

How many and where are swimming pools located on post?

Response Organizations and Units

How long will it take for you or a representative of your organization to respond onsite to water facilities (tanks, water treatment plant (WTP), source)?
Is there a Weapons of Mass Destruction (WMD) Civil Support Team in the region? What is it and where is it located?

Is there a local chemical, biological, radiological, nuclear, and explosives (CBRNE) team on post or within the region? CBIRF team?

How much time would it take for a fully outfitted CBRNE team to arrive at the water system?

What is your organization's role in a water system emergency?

Have you contacted any organizations outside the installation to provide any type of support if the water system is attacked? Not in service?

Are there any other organizations that you believe would/ could help during a water system emergency?

Who has jurisdiction if a criminal event occurs on the installation?

Are there any Memorandums of Understanding (MOU), Memorandums of Agreement (MOA), or Regional Assurance Acts (RAA) between the installation and your organization/company in the case of a water system emergency?

Logistics

If a contractor needs to come onto post to support the emergency situation, do they need to go through any protocols? Submit forms? Are there procedures already in place?

Public Notification

Who would notify the media if intentional contamination of the water system was suspected? Do you have scripted media notifications for suspected water system contamination? Do not use orders? Boil water advisories?

Do you have a list of media contacts on file (TV, radio, news, public access, megaphone)?

Is there a single location on/off post designated for the responding media representatives to broadcast from?

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APPENDIX D

OUTLINE OF AN EXAMPLE ERP

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1.0 OVERVIEW. The following paragraphs describe how Emergency Response Plans (ERPs) are organized if this protocol is used.

1.1 Summary Report. Part I includes a summary report that outlines the purpose, authority, and regulatory requirements for a Water System ERP. In addition, conclusions and recommendations are provided based on the conduct of the project as well as a copy of the certified letter that must be signed and completed for each water system and submitted to the U.S. Environmental Protection Agency (EPA). Each letter certifies that an ERP has been updated for one water system.

1.2 EOC Plan. Part II consists of a document to be maintained at the Emergency Operations Center (EOC). This subsection assigns policy and organizational responsibilities for investigation, response, and recovery operations to water contamination incidents. In addition, other information is provided to include notification and reporting procedures, available equipment and supply list, and a priority-of-service list, and training exercises and after-action review procedures.

1.3 DPW Support Plan. Part III contains a water system emergency support plan to be maintained by the Directorate of Public Works (DPW). This document contains standard general water system information, material safety data sheets, and organizational responsibilities in preparation for emergencies, water system maps, as well as sheets and forms to be used by the DPW personnel to investigate and respond to an emergency.

2.0 PLAN OUTLINE.

2.1 Part I, Summary Report.

- 2.1.1 References
- 2.1.2 Purpose
- 2.1.3 Authority
- 2.1.4 Project Team
- 2.1.5 General
  - 2.1.5.1 Project Background
  - 2.1.5.2 Project Protocol
  - 2.1.5.3 Installation Personnel Contacted
- 2.1.6 Regulatory Criteria
  - 2.1.6.1 Federal
  - 2.1.6.2 State
  - 2.1.6.3 Department of the Army
- 2.1.7 Installation Water Systems Included in the ERP
- 2.1.8 Conclusions
- 2.1.9 Recommendations
  - 2.1.9.1 Director, DPW

2.1.9.2 Director, Directorate of Contracting (DOC)
2.1.9.3 Director, Directorate of Plans, Training, Mobilization, and Security (DPTMS)
2.1.10 Additional Assistance
2.1.11 Reference Appendix
2.1.12 Personnel Contacted List Appendix
2.1.13 Certified Letter to be Signed and Sent to the EPA Appendix
2.1.14 Water System ERP Distribution Sheet Appendix

2.2 Part II, EOC Plan.

2.2.1 Purpose
2.2.2 Requirements
2.2.3 Scope
2.2.4 Terms, Abbreviations, and Definitions
2.2.5 Policy
2.2.6 Concept of Operations
2.2.7 Notifications
2.2.8 Emergency Preparation Responsibilities
2.2.9 Emergency Response Responsibilities
2.2.10 General Reporting Requirements
2.2.11 Appendices
2.2.11.1 Terms, Abbreviations, and Definitions
2.2.11.2 Water Emergency Checklist
2.2.11.3 Supplies and Equipment List and Location
2.2.11.4 Training and Exercises
2.2.11.5 Reporting
2.2.11.6 Alternate Potable, Nonpotable Water, and Ice Sources, Refrigeration Suppliers, and Sanitation Facilities
2.2.11.7 Water Emergency Restrictions
2.2.11.8 Estimated Critical User Emergency Water Requirements
2.2.11.9 Priority-Of-Service List for Critical Water Users
2.2.11.10 Decontamination and Disposal Considerations
2.2.11.11Evacuation Procedures
2.2.11.12 References

2.3 Part III, DPW Support Plan.

2.3.1 Installation Water System Overview
2.3.1.1Water System Owner and Responsibilities
2.3.1.2 Installation Community Water System
2.3.1.3 Installation NTNC Water Systems
2.3.2 Types of Emergencies to Expect
2.3.2.1 Types of Emergencies

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APPENDIX E

EXAMPLE SHEETS AND FORMS

LIST

Communications Log Sheet
Telephone Threat Record Sheet
Sample Chain-of-Custody Form
General Message Form, ICS Form 213
Initial News Release
Water Shutoff Notification Form
“Boil Water” Advisory Press Release
“Do Not Use” Order Press Release

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COMMUNICATIONS LOG, PAGE ____ of ____

NAME OF PERSON CONTACTED	TELEPHONE NUMBER	MILITARY TIME	DATE	INFORMATION PROVIDED/RECEIVED

**** To be used during an emergency for purposes of tracking who was contacted at what time and the information that was conveyed/received.***

TELEPHONE THREAT RECORD SHEET

Date of Call: _____ **Time of Call:** _____

Exact words of Caller: _____

_____

_____

_____

Characteristics of Caller:

Male ____ Female ____ Probable Race _____

Adult ____ Teen ____ Child _____ Est. Age _____

Characteristics of Speech:

Loud ____ Soft ____ Whisper _____ Normal _____

Drunk ____ Calm ____ Distinct _____ Nervous _____

Slurred ____ Excited ____ Accent Type _____

Background Noises: (Street sounds, party sounds, laughter, baby crying, etc.)

_____

_____

Ask:

What type of material? _____

Quantity of material? _____

Form of material? _____

Shape of material? _____

How is it being introduced? _____

Serial number of material? _____

What type of container? Shipping container number? _____

Are specific water supply/distribution facilities identified? _____

Name and location of person receiving the call: _____

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE IDENTIFICATION	1. **Sampler:**_____ Date:_____ Print:_____ **Witness:**_____ Date:_____ Print:_____
SAMPLE DATE AND TIME	2. **Receiver:**_____ Date:_____ Print:_____ **Witness:**_____ Date:_____
SAMPLE TYPE (circle one) solid, liquid, wipe, vapor	Print:_____ Location:_____
SAMPLE DESCRIPTION	3. **Receiver:**_____ Date:_____ Print:_____ **Witness:**_____ Date:_____ Print:_____ Location:_____
SAMPLE LOCATION	4. **Receiver:**_____ Date:_____ Print:_____ **Witness:**_____ Date:_____ Print:_____ Location:_____
COMMENTS:	

GENERAL MESSAGE

TO:	**POSITION:**	
FROM:	**POSITION:**	
SUBJECT:	**DATE:**	**TIME:**
MESSAGE:		
SIGNATURE:	**POSITION:**	
REPLY:		
DATE:	**TIME:**	**SIGNATURE/POSITION:**

GENERAL MESSAGE ICS FORM 213

INITIAL NEWS RELEASE FORM
(for distribution of previously identified, television, radio, and newspaper personnel.)

The following substance has been detected in the _____ system:

It is vital that all residents in the _____ area observe the following water use restrictions until further notice:

The characteristics and potential health hazards associated with this contaminant are as follows:

APG and water system personnel are taking the following steps to address the problem:

For further information please contact _____ at this phone number _____. A press conference is scheduled for _____ to be held at _____. News updates will be provided as additional information becomes available.

Attached is a copy of an information sheet which provides details concerning the physical plans, organizational structure, and function of the _____ water system.

Time: _____ **Date:** _____
Signed: _____
Title: _____

WATER SHUTOFF NOTIFICATION

The _____ water system will be turning the water off in your area in order to make necessary repairs to the system.

Area to be shutoff:

Date(s) and Time(s) of Shutoff:

Reason for shutoff:

Date of notice:

If you have any questions about the above information, please call

_____

"BOIL WATER" ADVISORY PRESS RELEASE

PRESS RELEASE

FOR IMMEDIATE RELEASE
CONTACT: _____ DATE: _____
TELEPHONE: _____

BOIL WATER ADVISORY

The Harford County Health Department; Aberdeen Proving Ground; and the Maryland Department of Environment, Division of Environmental Health, Public Water Supply Section; advise that there is a possibility of intentional contamination in the Edgewood Area water distribution system. Several recent test samples have revealed the presences of _____. However, the lab results indicated that the possible contaminant is NOT fecal origin. The Aberdeen Proving Ground Directorate of Safety, Health, and Environment have not been able to identify any reason or incident that would have caused the positive test results. Water samples will be taken daily until the contaminant is identified and the problem is resolved.

To ensure adequate public safety, you are advised to choose one of the following options for tap water used for drinking and cooking purposes:

1. Commercially available bottled water, or
2. Boil all tap water for at least 2 minutes at a full, roiling boil.

Until the health department and Aberdeen Proving Ground notifies you, all water obtained from the system for drinking and cooking should be boiled. If you have any questions, please contact the _____ health department, Maryland Department of Environment, Division of Environmental Health, Public Water Supply Section at _____, or the Aberdeen Proving Ground Directorate of Safety, Health, and Environment at _____.

[THIS NOTICE WAS DEVELOPED FROM OTHER BOIL WATER ADVISORY'S PROVIDED BY VARIOUS US DRINKING WATER AGENCIES. ABERDEEN PROVING GROUND SHOULD COORDINATE WITH THE STATE AND LOCAL HEALTH DEPARTMENTS **BEFORE ISSUING** THIS TYPE OF NOTICE.]

"DO-NOT-USE-WATER" ORDER PRESS RELEASE

PRESS RELEASE

FOR IMMEDIATE RELEASE
CONTACT: _____ DATE: _____
TELEPHONE: _____

DO NOT USE WATER ORDER

The Harford County Health Department; Aberdeen Proving Ground; and the Maryland Department of Environment, Division of Environmental Health, Public Water Supply Section; advise that there is a possibility of intentional contamination in the Edgewood Area water distribution system. Several recent test samples have revealed unexplained water quality changes and the presence of unidentified contaminants. The Aberdeen Proving Ground Directorate of Safety, Health, and Environment has not been able to identify any reason or incident that would have caused the water to change. The Aberdeen Proving Ground is working closely with the Harford County Health Department and will continue take water samples until the contaminant is identified and the problem are resolved.

To ensure adequate public safety, you are advised not to use any water from the distribution system. This warning includes cessation of any activity such as flushing toilets, washing, opening hydrants, or bathing. Boiling tap water will not remove the suspected contaminant and might even release it from the water.

Commercially available bottled water or water from military water purification units is strongly recommended and will be provided by Aberdeen Proving Ground Garrison.

Until the Harford County Health Department and Aberdeen Proving Ground notify you, no water from the system should be used. If you have any questions, please contact the Harford County Health Department, _____, or the state Public Water Supply Section, _____.

[THIS NOTICE WAS DEVELOPED BY THE USACHPPM. NO DO NOT USE ORDERS HAVE EVER BEEN ISSUED IN THE UNITED STATES AT THE DATE THIS PLAN WAS PUBLISHED. ABERDEEN PROVING GROUND SHOULD COORDINATE WITH THE STATE AND LOCAL HEALTH DEPARTMENTS **BEFORE ISSUING** THIS TYPE OF NOTICE. ALSO A DO NOT USE NOTICE PROHIBITS THE USE OF WATER FOR NOT ONLY DRINKING AND BATHING PURPOSES BUT ALSO SANITARY USE (E.G., TOILETS). APG MUST COORDINATE WITH PUBLIC HEALTH OFFICIALS **BEFORE ISSUING** THIS NOTICE.]

APPENDIX F

USEFUL POTABLE WATER EMERGENCY / CONTINGENCY PLAN TEMPLATES

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1.0 SAMPLE WATER TREATMENT PROCESS DESCRIPTION.

1.1. Raw Water Supply.

1.1.1. The raw water supply for ___ is obtained from the ___ square mile ____ watershed. The water is of good quality and is considered soft mountain stream water. Artificial storage of water is provided by __ Lake (capacity __ mg), __ Lake (capacity __ mg) and __ Lake (capacity __ mg). This supply is supplemented from the ____ Lake, according to an agreement with _____.

1.1.2. The safe yield of the total supply system is ____ million gallons per day (mgd). Impounding water behind dams promotes the growth of algae for which corrective copper sulfate treatment is provided.

1.2. Transmission to Post.

1.2.1. The __ intake transports raw water by gravity through an 8-year-old, ___ inch cast iron pipe. The water flows __ miles to __ Lake for storage on the main post. Capacity of the __ inch line is approximately __ mgd after cleaning.

1.2.2. __ Lake has a capacity of __ million gallons with a usable capacity of __ million gallons. The intakes have spillways almost level with each other and __ feet higher than the __ Lake spillway elevation of __ feet. __ Lake is the direct source of __ Water Treatment Plant (WTP) located adjacent to the Lake. The __ WTP went into service in 19__. A diagram of the __ WTP is provided at page (not included).

1.2.3. __ Intake House.

1.2.3.1. A small intake station has __ sluice gates at elevations of __ ft. and __ ft. Depending on the quantity of raw water in __ Lake, water can be withdrawn through any gate.

1.2.3.2. Fine screen (__ inch) mesh over the __ sluice gate openings prevent leaves, sticks, fish, and other debris from entering the WTP.

1.3. Water Treatment Plant.

1.3.1. Mixing Chamber and Flocculator.

1.3.1.1. The mixing chamber is a small tank where chemicals are mechanically mixed with water before entering the flocculator. The flocculator is a chamber consisting of slowly revolving, vertically orientated, paddles. Chlorine and aluminum sulfate (alum) machines, to feed these two chemicals, are located here. Chlorine is used for disinfection. Alum is used for flocculation and coagulation. Alum

reacts with natural alkalinity to form aluminum hydroxide – a sticky gelatinous substance. The alkalinity is diminished and the carbon dioxide increased – a condition that is corrected after filtration. Alum also removes color, which is a colloid of the humic acid type, originating from decayed organic matter.

1.3.1.2. When water enters the flocculator chamber, a "pin-head" floc forms. The revolving paddles cause these "pin-heads" to collide which forms larger particles that will sink more rapidly in the settling basins.

1.3.2. Accelator.

1.3.2.1. A circular treating unit known as an accelator is a radial up-flow tank with a 1- hour detention period that has a recirculating device to mix newly formed alum floc with existing alum slurry. It can deliver either to the settling basins or directly to the filters (although the latter is not done). This unit is equipped with chlorine, alum, and carbon feed machines.

1.3.2.2. The functions of the mixing chamber and settling basin are intended to be combined in the accelator. By means of baffles and gentle pumping, alum slurry is kept in a state of revolution, and the raw water with newly formed alum floc is added. In the outer chamber or clarifier section, a slurry blanket is formed and the water must rise vertically from this blanket to get out. This produces a set of physical conditions that frees the water of most of the suspended material. Sludge is generally removed at the rate of formation by adjusting a time switch which operates the sludge pump at 15-minute intervals. The alum is applied to the raw water entering the accelator. Although the unit produces good results, it does not remove enough of the suspended alum floc to permit direct application to the filters. The effluent therefore flows into a settling basin.

1.3.3. Application of Prechlorination and Carbon.

1.3.3.1. According to local experience, the best results are obtained by allowing the alum to perform its functions before adding the chlorine. The chlorine is therefore applied to the water entering the settling basins. Chlorine forms hypochlorous acid, hydrochloric acid, and oxygen. These compounds act to kill bacteria. The chlorine feed is adjusted to keep 0.10 ppm free chlorine in the water leaving the settling basins.

1.3.3.2. Activated powdered carbon is used only when the raw water contains taste and odor producing substances which have resisted removal by the normal process. It is applied to the water in the settling chamber of the accelator.

1.3.4. Sedimentation.

1.3.4.1. Sedimentation consists of two settling basins. Basin 1 has a capacity of __ gallons with a detention time of ___ hours. Basin 2 has a capacity of ___ gallons with a detention time, also, of ___ hours.

1.3.4.2. The settling basins provide time for completing chemical reactions and remove most of the impurities by sedimentation. The descending floc "sweeps" turbidity and bacteria down with it. The sludge is removed two or three times a year.

1.3.5. Filtration.

1.3.5.1. Filtration consists of ___ rapid sand filters. Each are ___ft and are rated at ___ gallons per day. ____ filters are automated, ___ operated hydraulically, and ___ operated manually.

1.3.5.2. A small amount of floc remaining in the water leaving the settling basins coats the sand surface of the filter. This is sticky and strains out remaining bacteria and suspended particles. A dense mat builds up and finally blocks the flow enough to warrant cleaning. Cleaning is accomplished by pushing water up through the sand and washing the dirt into the sanitary sewer.

1.3.6. Filtered Water Dosing Pits.

1.3.6.1. The dosing pit provides a place where the filtered water can receive chemical treatment before entering the clearwell and going to the consumer. It is baffled so water is uniformly dosed and so that precipitates that form can settle without passing into the water system.

1.3.6.2. A small dosing pit is used for applying soda ash, fluoride, and chlorine to filtered water. Soda ash and fluoride feeders are located between the settling basins adjacent to the chemical storage space above the Number __ settling basin. They are dry chemical machines with solution tanks. The solutions flow to the dosing pit through gravity. The chlorine feeder is on the floor above the dosing pit.

1.3.7. Soda Ash, Fluoride, Chlorine.

1.3.7.1. Sodium carbonate (soda ash) is added to the filtered water to take up carbon dioxide by forming sodium bicarbonate. This eliminated the main cold water pipe corrosive element. Incidentally, the soda ash softens the water slightly by removing calcium sulfate – a byproduct of the alum reactions.

1.3.7.2. Because it costs less, lime is often substituted for soda ash. Lime proved unsuitable for the water treated at _____ because it failed to check corrosion in

the cold water pipes and because it sludged out in the domestic hot water heaters. Lime also hardens the water which increases soap consumption. The use of soda ash obviates the necessity of installing softeners for the boiler water at the utility or the water at the laundry.

1.3.7.3. The application of the fluoride ion was commenced for the benefit of dental hygiene. Sodium silicon fluoride is used to furnish this ion.

1.3.7.4. Chlorine is again applied to the water after it leaves the filters as the chlorine previously applied has been consumed. The feed is small and is intended to kill any bacteria that may have passed though the filters and to provide the water with power to resist further contamination.

1.3.8. Laboratory Control.

1.3.8.1. Daily chemical, bacteriological, and physical tests are necessary to control the purification process. Samples of the raw, settled, and plant tap waters are analyzed each day. In the bacteriological test, specific procedures are followed to detect the presence of coliforms, since this is considered evidence of sewage contamination.

1.3.8.2. To discover any changes taking place in the distribution system and to further measure the effectiveness of the treatment process, samples are collected from the user's taps. These samples are collected weekly.

1.3.9. Reports. The daily plant operating conditions, storage figures, consumptions, total water treated and results of all chemical, physical, and bacteriological tests are kept at the WTP. An additional water system operating report is submitted to the ___ County Department of Health each month.

1.4. Storage and Distribution.

1.4.1 Storage. Normally the ___ WTP supplies water to the ___ and ___ water districts. The water districts are depicted on the diagram (not shown). The ___ and ___ Districts have the following storage capacities:

Facility	Capacity (gal)	Elev. Empty (ft)	Elev. Full (ft)
Tank 1	__	__	__
Tank 2	__	__	__
Tank 3	__	__	__
Tank 4	__	__	__
Tank 5	__	__	__
Total	__ gallons		

1.4.2. Distribution System.

1.4.2.1. There are approximately __ linear feet of pipes ranging in size from __ to __ inch diameter.

1.4.2.2. Additionally, there are __ fire hydrants located on __ for fire protection.

1.4.3. Pumping Equipment.

1.4.3.1. At __ WTP.

__ ea __ gpm, __ ft. head, __ HP motors for backwash.
__ ea __ gpm, __ ft. head, __ HP motors for __ level pumping.
__ ea __ gpm, __ ft. head, __ HP motors for __ level pumping.

1.4.3.2. At __ Pumphouse.

__ ea __ gpm, __ ft. head, __ HP motors for __ level pumping.
__ ea __ gpm, __ ft. head, __ HP motors for __ level pumping

1.4.4. Chemical Storage and Controls.

1.4.4.1. Warehouse space in the mixing chamber is sufficient to store a __ month supply of alum and soda ash. This is necessary to obtain economical prices and to ensure the plant maintains adequate quantities of these essential materials. The chlorine utilized is stored in __ pound cylinders.

1.4.4.2. A system of electrical transmitters, receivers, and recorders centralizing all tank, pumping stations, and water meter readings are installed at __ WTP.

2.0 SAMPLE EMERGENCY SUPPLIES AND EQUIPMENT LIST.

2.1. Equipment Available.

2.1.1. DPW, Maintenance Division.

1 ea Backhoes (JD-410)
1 ea Front End Loaders
1 ea Pump Trucks (1,700 and 2,800 gal)
1 ea Vacuum Truck
1 ea Jet Rodder Truck
1 ea Road Graders

1 ea 22 Ton Crane
2 ea 8 Ton Dump Trucks
Misc. Pumps and Generators

2.1.2 Engineer Platoon.

2 ea Bulldozer (D-7)
1 ea Scoop Loaders
1 ea 25 Ton Crane
1 ea Backhoe (JD-410)
1 ea Road Scrapers
1 ea 5 Ton Dump Trucks
1 ea 8 Ton Dump Trucks

2.1.3 Directorate of Logistics (DOL), Transportation and Maintenance Division.

10 ea 400 gal Water Trailers
1 ea 1,000 gal Tanker Trucks

2.2. Supplies Available.

2.2.1. __ WTP.

1 ea 150 gpm Gasoline Pumps
1 ea 100 gpd Pumps for calcium Hypochlorite

2.2.2. Supply Division.

1 ea Repair Clamps, 411 to 2011
1 ea Sections of Water Main, 411 to 2011

3.0 BASIC REPAIR PROCEDURES.

3.1 Power Outage.

3.1.1 If a power outage affects WTP operations, call the Central Power Plant, ext. __ and provide details of the facilities that have been affected.

3.1.2. Contact all Utilities personnel in Alert Roster (Appendix _).

3. 1.3. Contact the __ County Department of Health if water service is interrupted for more than 4 hours (see Main Failure Procedures). Contact PVNTMED (see Appendix _) if interruption exceeds 4 hours.

3. 1.4. Consider activating auxiliary pumps. Each water district pump station has a backup gasoline pump.

3. 1.5. Contact the Military Police, ext. __ and the Fire Department ext. __ of any anticipated reduction in water pressure.

3. 1.6. Determine if the Water Conservation Plan (Appendix _) requires implementation.

3.2 Water Storage Tank Failure.

3.2.1. Notify the WTP Foreman, ext. __ and the Chief of Utilities, ext. __.

3.2.2. Isolate the water storage tank from the distribution system.

3.2.3. Supply system from adjoining district or pump to district and open relief valve at water storage tank valve vault.

3.2.4. Institute water restriction program if required.

3.2.5. Disinfect repair and sample to ensure potability of effluent.

3.3 Distribution System Water Main Failure.

3.3.1. Notify the WTP Foreman, ext. __ and the Chief of Utilities, ext. __.

3.3.2. Notify customers in the affected area of shut off by door to door or public address system. If this shut off affects 1 percent or more of the population for more than 4 hours, notify the __ County Department of Health at __. 1 percent equates to 20 people for the __ WTP and 30 people for the __ WTP.

3.3.3. Shut off area of break. Water system maps are located in buildings __ or __.

3.3.4. Notify Maintenance, ext. __ and Pipe Shop, ext. __ to excavate and repair leak.

3.3.5. If water service interruption will exceed 24 hours, provide potable water tank units to affected areas. Coordinate with the Engineer Platoon to obtain "Water Buffalos." The DOL can obtain emergency supplies of bottled water if required.

3.3.6. The WTP personnel will disinfect replaced pipes according to the provisions of the American Water Works Association (Standard C651-92). Disinfection of the piping may involve two issues. To disinfect the fittings we will wash the pieces in

a solution of sodium hypochlorite prior to installation. To disinfect the piping we will flush the pipe to remove gross material and until discolored water is eliminated. The disinfection of piping will necessitate introducing a solution of 300 ppm of chlorine with a contact time of 15 minutes. The line will be flushed until the solution is less than 1.0 ppm. The effluent will be collected and introduced into the sanitary sewer if practical. Workers shall observe sanitary technique.

3.3.7. Promptly notify PVNTMED of location of leaks to allow for water sampling surveys.

APPENDIX G

EPA RECOMMENDED COMPONENTS OF AN EMERGENCY WATER COLLECTION AND TEST KIT

(As of 12/18/2004)

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1.0 SAMPLE COLLECTION MATERIALS.

1.1 Field Resources and Documentation.
- 1.1.1 Custody tape (or seals) - 2 rolls
- 1.1.2 Lab marker - 2 (1 red, 1 black)
- 1.1.3 Sample Labels (48) 1" x 6.5"

1.2 General Sampling Supplies.
- 1.2.1 Sample bottles
  - 40 mL clear vial w/teflon septa (with and without preservatives)
  - 1 L Amber bottle w/teflon liner & screw cap (with and without preservatives)
  - 1 L Amber bottle silanized (with and without preservatives)
  - 125 mL natural HDPE bottle (with and without preservatives)
  - 1000 mL Amber bottle widemouth (with and without preservatives)
  - 2 L natural HDPE bottle
  - 120 mL coliform bottle sterile, 100 mL fill line with sodium thiosulfate
  - 250 mL Nalgene wide mouth bottle
    1 L natural HDPE wide mouth
  - 125 mL amber bottle
  - Blue capped autoclaved bottles 125 mL plastic for total and fecal coliform
- 1.2.2 Device for grab sampling
- 1.2.3 Small Bottle Attachment, Snapper Band
- 1.2.4 Large Bottle Attachment, Snapper Band
- 1.2.5 Collapsible cubitainers -20 L
- 1.2.6 Lab grade tape
- 1.2.7 Collapsible cooler
- 1.2.8 Rigid cooler
- 1.2.9 1 gallon zippered freezer bags
- 1.2.10 Thermometer (2), -20 C to 150 C red mineral
- 1.2.11 Paper towels

1.3 Pathogen Sampling Supplies.
- 1.3.1 Tubing and clamp (1)
- 1.3.2 Ultrafiltration apparatus (1)

1.4 Reagents (kept separate from the rest of the kit).
- 1.4.1 Laboratory grade water (5 gallons)
- 1.4.2 pH paper in ranges from 0 - 4 and 10 - 14
- 1.4.3 Sodium thiosulfate crystals (premeasured for addition to sample bottles)
- 1.4.4 Ascorbic acid (premeasured for addition to sample bottles)
- 1.4.5 Sodium sulfite crystals (premeasured for addition to sample bottles) Potassium dihydrogen citrate (potassium citrate monohydrate) (premeasured for addition to sample bottles).

1.5 Safety Supplies.
- 1.5.1 Splash resistant goggles
- 1.5.2 Disposable gloves NDEX long cuff
- 1.5.3 Disposable shoe covers
- 1.5.4 Disposable laboratory coats
- 1.5.5 Clear, heavy duty plastic trash bags
- 1.5.6 Rinse water
- 1.5.7 Antiseptic wipes
- 1.5.8 Bleach solution (at least 5%)
- 1.5.9 Squirt bottle
- 1.5.10 First aid kit
- 1.5.11 Duct tape
- 1.5.12 Clear tape
- 1.5.13 Tape dispenser
- 1.5.14 Kimwips (smaller)
- 1.5.15 Bubble wrap bags
- 1.5.16 Flashlight
- 1.5.17 Extra batteries
- 1.5.18 Cordless High Intensity Spot-Light

2.0 RAPID WATER TESTING EQUIPMENT.

2.1 YSI 556 Multiparameter Probe. (pH, conductivity, temperature, and DO)
2.2 DR-2400 Portable Spectrophotometer. (arsenic, cadmium, chromium, and nitrite)
2.3 Rapid Toxicity Unit - ECLOX Water Test Kit.
2.4 Ricin BioTest Strips.
2.5 Portable Turbidimeter.
2.6 Digital Titration. (Alkalinity Test Equipment)
2.7 Smart 2 Colorimeter. (free and total chlorine, ammonia, cyanide, and fluoride)

3.0 FIELD SAFETY SCREENING EQUIPMENT. Inspector EXP Digital Geiger Counter with External Pancake Probe.

GLOSSARY

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SECTION I. ABBREVIATIONS

AAFES ..... Army and Air Force Exchange Service
AAR ..... After Action Review
ACSIM ..... Assistant Chief of Staff for Installation Management
ADUSD ..... Assistant Deputy Under Secretary of Defense
AOC ..... Army Operations Center
AR ..... Army Regulation
ARNG ..... Army National Guard
ASDWA ..... Association of State Drinking Water Administrators
AWWA ..... American Waterworks Association

CDC ..... Centers for Disease Control
CBIRF ..... Chemical Biological Incident Response Force
CBRNE ..... Chemical, Biological, Radiological, Nuclear, and Explosives
CEPPO ..... Chemical Emergency Preparedness and Prevention Office
COE ..... U.S. Army Corps of Engineers
CONUS ..... Continental United States
COR ..... Contract Officer Representative
CP ..... Command Post
CST ..... Civil Support Team
CWS ..... Community Water System

DA ..... Department of the Army
DHS ..... Department of Homeland Security
DOD ..... Department of Defense
DOE ..... Department of Energy
DOH ..... Department of Health
DOJ ..... Department of Justice
DOL ..... Directorate of Logistics
DPTMS ..... Directorate of Plans, Training, Mobilization, and Security
DPW ..... Directorate of Public Works

EAP ..... Emergency Action Procedure
ECBC ..... Edgewood Chemical Biological Center
EMS ..... Emergency Medical Services
EOC ..... Emergency Operations Center
EOD ..... Explosive Ordnance Disposal
ERP ..... Emergency Response Plan
EPA ..... U.S. Environmental Protection Agency

FAWPSS ..... Forward Area Water Point Supply System
FBI ..... Federal Bureau of Investigation

FEMA ..... Federal Management Emergency Agency
FOUO ..... For Official Use Only
FPCON ..... Force Protection Conditions
FRP ..... Federal Response Plan

GAC ..... Granular Activated Carbon
GC ..... Garrison Commander
GIS ..... Geographical Imaging System
GOCO ..... Government-Owned, Contractor Operated

HAZMAT ..... Hazardous Materials
HRT ..... High-risk Target
HMMWV ..... High Mobility Multipurpose Wheeled Vehicle
HQ ..... Headquarters
HQDA ..... Headquarters, Department of the Army

IAP ..... Incident Action Plan
IAW ..... In Accordance With
IC ..... Incident Commander
ICP ..... Incident Command Post
ICS ..... Incident Command System
ID ..... Identification
IMA ..... U.S. Army Installation Management Agency
IOC ..... Installation Operations Center
ISCP ..... Installation Spill Contingency Plan
IUMP ..... Integrated Utility Management Plan

JIC ..... Joint Information Center
JCS ..... Joint Chiefs of Staff
JOC ..... Joint Operations Center

LEPC ..... Local Emergency Planning Committee
LWP ..... Lightweight Water Purifier

MACOM ..... Major Army Command
MEVA ..... Mission Essential Vulnerable Assets
MI ..... Military Intelligence
MOA ..... Memorandum of Agreement
MOU ..... Memorandum of Understanding
MP ..... Military Police
MSDS ..... Material Safety Data Sheet
MWR ..... Morale Welfare and Recreation

NBC ..... Nuclear, Chemical, Biological

NCP ..... National Contingency Plan
NeRWA ..... Northeast Rural Water Association
NIIMS ..... National Interagency Incident Management System
NPDWR ..... National Primary Drinking Water Regulations
NRC ..... National Response Center
NRWA ..... National Rural Water Association

OCONUS ..... Outside the Continental United States
OEGBD ..... Overseas Environmental Governing Baseline Guidance Document
OSC ..... On-Scene Coordinator

PAO ..... Public Affairs Office
PPE ..... Personal Protective Equipment
POC ..... Point of Contact
PVNTMED ..... Preventive Medicine
PWS/DS ..... Potable Water Storage and Distribution System

ROWPU ..... Reverse Osmosis Purification Unit

SCADA ..... Supervisory Control and Data Acquisition Systems
SDWA ..... Safe Drinking Water Act
SEMS ..... Standardized Emergency Management Agency
SERC ..... State Emergency Response Commission
SMART ..... Special Medical Augmentation Response Team
SMFT ..... Semi-Trailer Mounted Fabric Tank
SOP ..... Standard Operating Procedure
SPCCP ..... Spill Prevention, Control, and Countermeasure Plan

TB MED ..... Technical Bulletin Medical
TEU ..... Tech Escort Unit
TG ..... Technical Guide
TO&E ..... Table of Organization and Equipment
TWDS ..... Tactical Water Distribution System
TWPS ..... Tactical Water Purification System

USACHPPM ..... U.S. Army Center for Health Promotion and Preventive Medicine
USAMRIID ..... U.S. Army Medical Research Institute of Infectious Diseases
USARDECOM ..... U.S. Army Research Development and Engineering Command
USASBCCOM ..... U.S. Army Soldier Biological Chemical Command
UXO ..... Unexploded Ordnance

Water ISAC ..... Water Information Sharing and Analysis Center
WD/WMS ..... Water Distribution and Waste Management System
WMD ..... Weapons of Mass Destruction

WRMP.....Water Resources Management Plan
WTP .....Water Treatment Plant

SECTION II. TERMS

Advisory
A non-regulatory document that communicates risk information to those who may have to make risk management decisions.

Confirmed Incident
A water system attack or water contamination incident is confirmed if the information collected over the course of the threat evaluation provides definitive evidence that the water system has been attacked and/or contaminated.

Contaminant
Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contamination
Introduction into water, air, and soil of microorganisms, chemicals, toxic substances, wastes, or wastewater in a concentration that makes the medium unfit for its next intended use. Also applies to surfaces of objects, buildings, and various household and agricultural use products.

Credible Threat
A water system attack or water contamination incident is characterized as credible if information collected during the threat evaluation process corroborates information from the threat warning.

Decontamination
Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Disinfectant
A chemical or physical process that kills pathogenic organisms in water, air, or on surfaces. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

Emergency Operations Center (EOC)
A pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency.

Hazard
A source of potential damage that interferes with the ability to deliver potable water of adequate quality, quantity, and/or pressure.

Hazardous Waste
By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special U.S Environmental Protection Agency (EPA) lists.

Hotline
The Hotline separates the Contamination Reduction Area (which may actually have contamination in it) from the potential contaminated area.

Incident Command System
A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure appropriate for the complexity and demands of single or multiple incidents without being hindered by jurisdictional boundaries.

Incident Commander (IC)
The individual responsible for the management of all incident operations.

Installation Operations Center (IOC)
Same as the EOC. A pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency.

National Response Center
A joint EPA and U.S. Coast Guard (USCG) Communications Center that takes the legally required reports of oil or hazardous substance spills or releases at or above the reportable quantities and communicates these to the pre-designated on-scene coordinator for their action.

On-scene coordinator (OSC)
As defined by the National Contingency Plan (NCP), the OSC is the Federal official pre-designated by EPA or the USCG to coordinate and direct Federal responses under subpart D of the NCP, or the official designated by the lead agency to coordinate and direct removal actions under subpart E of the NCP, Department of Defense (DOD) and Department of Energy (DOE) are included as OSC under subpart E.

Possible Threat
In the context of the threat evaluation process, a water system attack and/or contamination threat is characterized as possible if the circumstances of the threat warning appear to have provided an opportunity for contamination.

Potable Water
Water that is safe for drinking and cooking.

Safe Water
Water that does not contain harmful bacteria, toxic materials, or chemicals and is considered safe for drinking even if it may have taste, odor, color, and certain mineral problems.

Threat
An indication that a harmful incident, such as contamination of the drinking water supply, may have occurred. The threat may be direct, such as a verbal or written threat, or circumstantial, such as a security breach or unusual water quality.

Threat Warning
An unusual occurrence, observation, or discovery that indicates a potential attack and/or contamination incident and initiates actions to address this concern.

Water Supplier
One who owns or operates a public water system.

Water Supply System
The collection, treatment, storage, and distribution of potable water from source to consumer.

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