

# Drinking Water Incident Response



Kentucky Department for Environmental Protection  
Standard Operating Guideline

September 2011

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## **1.0 INTRODUCTION**

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### **1.1 Purpose**

The purpose of the Drinking Water Incident Response Standard Operating Guideline (SOG) is to identify agencies that could respond to a drinking water emergency at a public water system from the result of source or finished water contamination, treatment or distribution system malfunction, power failure or other reason that results in a lack of potable water to the consuming public. Specifically, this Response SOG provides for the following:

- Outlines the roles, responsibilities, and inter-relationships of each state agency and defines those actions that are recommended to occur until the public water system returns to normal operation and/or the contamination is no longer detected, or at levels scientifically shown to not cause public harm.
- Delineates lead agencies, and the jurisdictional and regulatory authority of each state and Federal agency that might respond to a drinking water emergency.
- Provides the framework for a coordinated command and management response to a drinking water emergency

#### **1.1.1 Guiding Principals**

The details of the activities described herein will be undertaken in accordance with the principles of the Kentucky Emergency Operations Plan (KYEOP), the Safe Drinking Water Act (SDWA)<sup>1</sup>, National Primary Drinking Water Regulations (NPDWRs), Public Health Security and Bioterrorism Preparedness and Response Act of 2002, and National Incident Management System (NIMS). The emergency planning guide specifically (1) applies to the response and short-term recovery phases of a drinking water emergency (2) addresses state-level roles, and responsibilities vested to applicable entities within the Commonwealth, and (3) discusses the various response actions used to coordinate a unified response to a disruption of potable water service.

### **1.2 Background**

At the time of this writing, the Kentucky Department for Environmental Protection (DEP) Division of Water (DOW) regulates over four hundred sixty (460) Public Water Systems (PWS), fifty (50) semi-public water systems and seven (7) bottled water facilities. The majority (70%) of the PWS are considered “surface water” systems (source water is a lake, reservoir, river or spring). The remaining PWS (30%) are classified as “groundwater” systems with source water from drilled groundwater wells and, in some cases, abandoned mines.<sup>2</sup>

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<sup>1</sup> Enacted in 1974, allows the EPA to award states primary enforcement responsibility for public water

<sup>2</sup> Taken from “*Kentucky Public Water System Statistics*” compiled by Julie Roney in November 2010.

The Kentucky Department for Environmental Protection (DEP) has collaboratively worked to develop water standards and regulations that assist in managing the Commonwealth's water resources. As part of this planning process, a key component is the protection of public health by ensuring safe, reliable drinking water systems.

In response to a drinking water emergency, various state cabinets, local government, Public Water System (PWS) personnel and federal agencies are called upon to assist local drinking water providers in stabilizing the emergency. When called upon, state agencies must provide a unified and organized response. This response to any type of drinking water emergency is based on an all-hazards approach that encompasses the multitude of possible emergencies from natural disasters to acts of terrorism that could impact the public's water system. Therefore, this plan defines the state organization response that will support local governments and other entities with a drinking water emergency

### **1.3 Authorities**

#### **Federal Statutes:**

- Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (PL 107-188)
- National Primary Drinking Water Regulations Title 40 CFR 141
- National Primary Drinking Water Regulations Title 40 CFR 142
- Pandemic and All-Hazards Preparedness Act, Pub. L. No. 109-417
- Ports and Waterways Safety Act of 1972, Pub. L. No. 92-340 (codified as amended at 33 U.S.C. §1221-1236)
- Federal Water Pollution Control Act (Clean Water Act), 62 Stat. 1155 (codified as amended at 33 U.S.C. § 1251-1387)
- Conservation of Power and Water Resources, 18 C.F.R. Part 1-390 (2010)
- Navigation and Navigable Waters, 33 C.F.R. Part 1-399 (2009)
- Robert T. Stafford Disaster Relief and Emergency Assistance Act, Pub. L. No. 93-288 (as amended at 42 U.S.C. § 5121-5207)
- Homeland Security Act of 2002, Pub. L. No. 107-296 (codified as amended at 6 U.S.C. § 101-1405)
- Homeland Security Presidential Directive 7, *Critical Infrastructure*, (December 2003)
- Homeland Security Presidential Directive 8, *National Preparedness*, (December 2003)
- Homeland Security Presidential Directive 5, *Domestic Incident Management*, (February 2005)
- Post-Katrina Emergency Management Reform Act (PKEMRA) of 2006, Pub. L. No. 109-295

### **State References:**

- Kentucky Title V Chapter 39, Disaster and Emergency Services Management
- Kentucky Emergency Operations Plan (KYEOP)
- Kentucky Title XVIII Public Health Chapter 224 Environmental Protection, Subchapter 7 Water Quality

### **Other Related References:**

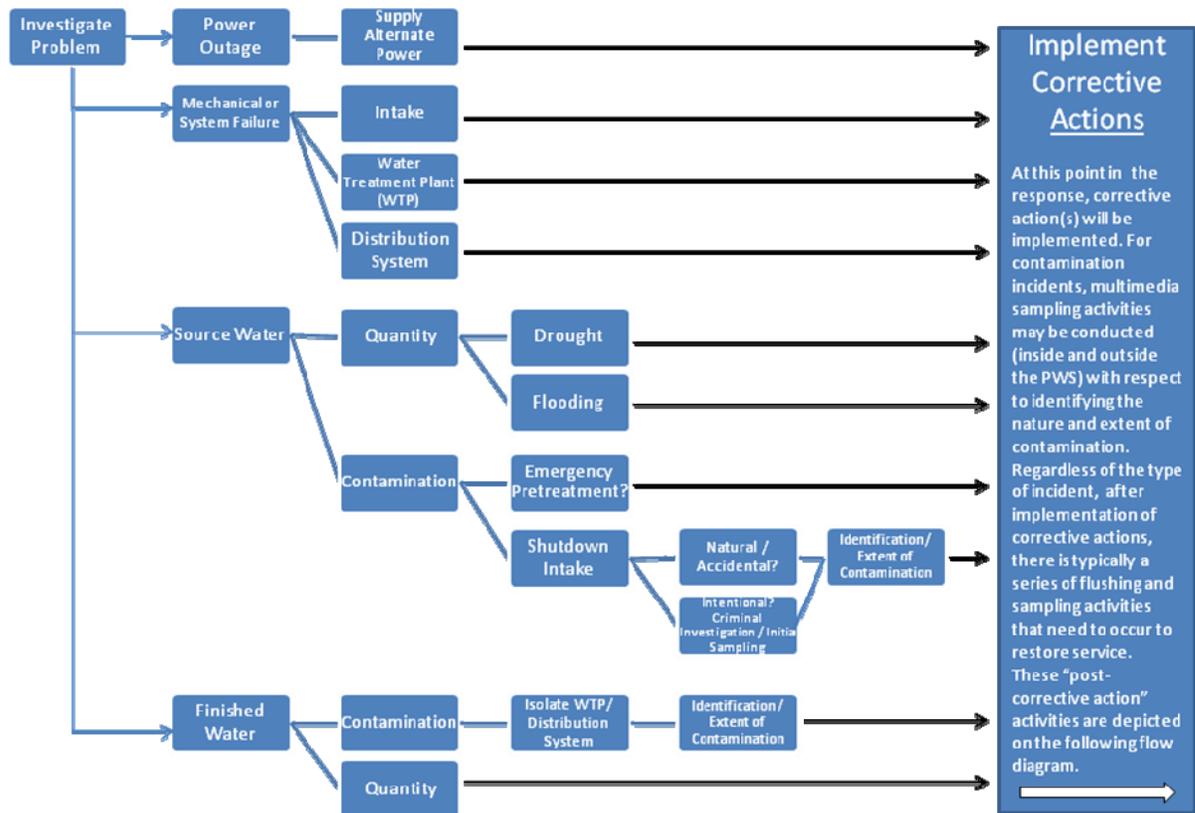
- Quality Management Plan, Department for Environmental Protection
- Standard Operating Procedures, Division of Water

## **1.4 Drinking Water Service Disruptions**

A water system may be vulnerable to many natural and man-made disasters or emergency events. The information provided in Figure 1 is an overview of problems that can cause disruption of potable water service. In each case, certain investigatory steps taken at the outset of a service disruption ultimately leading to implementation of corrective actions. All four categories of service disruption ( power outage, mechanical or system failure, source water, and finished water problems) could result from intentional causes which should be investigated by law enforcement in parallel with efforts to restore service.

- **Power Outage:** Regardless of the cause (natural disaster or intentional), power failure can significantly disrupt drinking water service. The emphasis will be on providing alternate power, typically “portable” generators, at the intake, Water Treatment Plant or distribution system facilities where needed. From a planning perspective, water systems should be encouraged to identify and put in place the necessary electrical systems to be able to accept alternate power in the event of an emergency.
- **Mechanical/System Failure:** Encompasses all types of mechanical (pumps, pipes, valves, tanks) and system (SCADA, electrical) failures. They are further broken down into the portion of the PWS (intake, WTP, distribution) where the failure(s) occurred.
- **Source Water:** Covers problems with quantity (drought, flooding) or contamination (natural, accidental, intentional) of the source water supplying the WTP. Emergency pretreatment should be quickly evaluated to protect the water system. In cases of intentional contamination the PWS may consider grab samples, prior to implementing corrective actions (flushing, etc.), in concert with law enforcement investigations. Regardless of the method by which the contaminants were introduced, the extent of contamination and the identity of contaminants should be actively pursued.
- **Finished Water:** Covers service disruptions from contamination (natural, accidental, intentional) or quantity (insufficient to meet demand) but in this case the problem is with treated water. The same impetus for criminal investigation and preliminary sampling exists in the event of intentional contamination, but the focus in the finished water system should be on isolation, identification of contaminants and the extent of contamination.

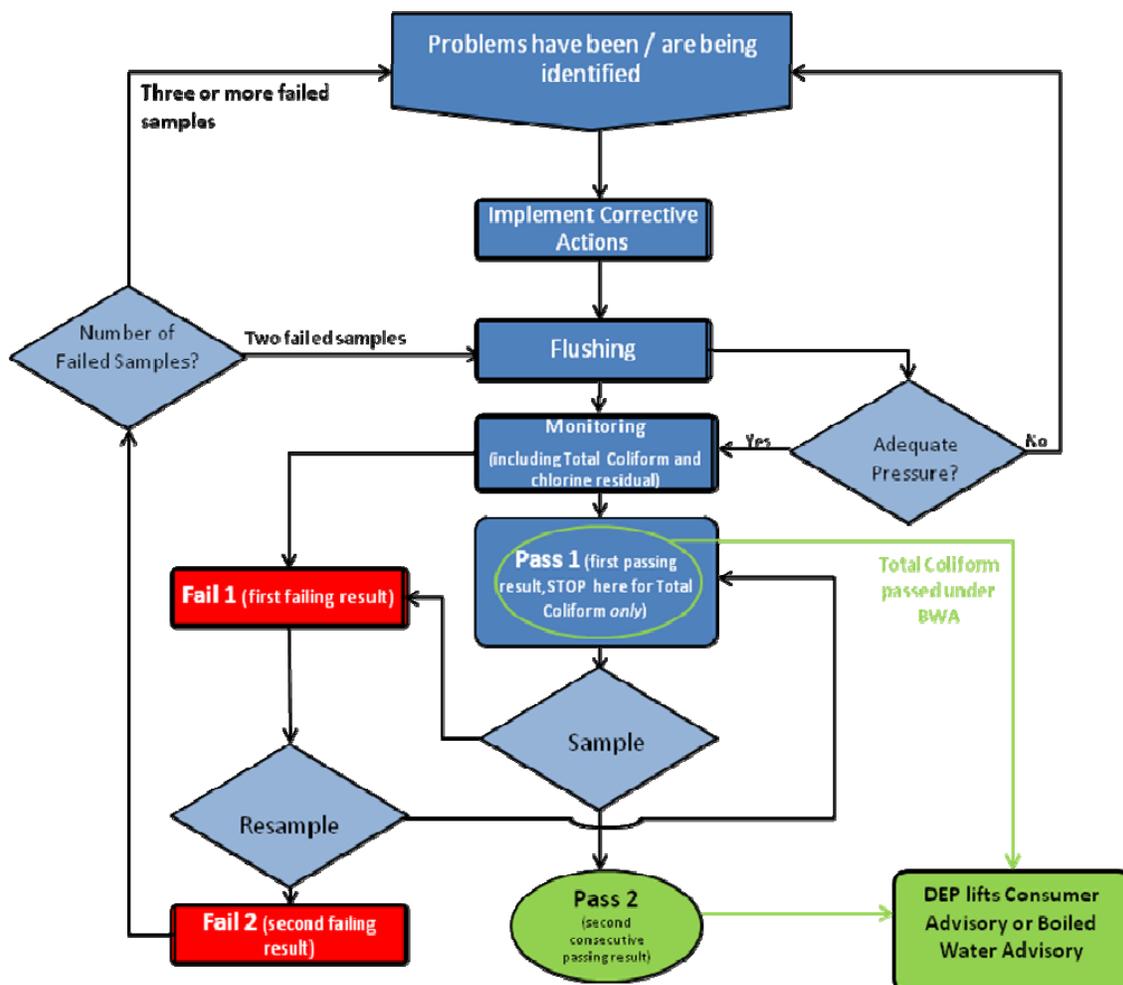
**Figure 1**  
**Investigate the Problem**



Following identification of the problems, restoration of drinking water service generally includes the following elements (depicted in Figure 2):

- Issue Advisory
- Implement corrective actions
- Monitoring (includes field screening, sampling, etc.)
- Flushing
- Results of monitoring, screening and/or laboratory analysis received
- Lift Advisory

Figure 2<sup>3</sup>  
Implementing Corrective Actions, Flushing and Sampling Flowchart



## 1.5 Critical Considerations

- Development of a Common Operating Picture (COP) concerning the severity of the water emergency and immediate state support needs will be difficult to obtain in the first 24 hours.
- Commonwealth resources will be prioritized to support life saving and life-sustaining missions, address public health and safety, and prevent further contamination or damage to public water systems.
- Response operations must be coordinated with public water providers to meet public drinking water needs.

<sup>3</sup> This *Implementing Corrective Actions, Flushing and Sampling Flowchart* is intentionally general, for greater detail refer to the DEP *Drinking Water Incident Sampling Standard Operating Guideline* (May 2011) and the additional references contained therein.

- Emergency provision of drinking water may be required until public drinking water service is restored.
- Rapid investigation and damage assessment is critical in determining the stage of the incident and assisting water providers in matching response resources to the appropriate need.

## **1.6 Critical Assumptions**

Every potable water service disruption may not require response from all entities, however, a coordinated response is a priority and incident management organizations should be constructed to allow for expansion and contraction of personnel and resources required for the response. Another key assumption in the drive toward service restoration is that most problems encountered in a drinking water system, except total coliform exceedances, require two (2) consecutive days of “clean” samples prior to restoring service.

## **1.7 Mission-Essential Tasks**

The overall response strategy for state agencies is to ensure for an organized, rapid and scalable response of state assets to a drinking water emergency. Due to the nature of a drinking water emergency, no one agency can coordinate and meet all of the possible core response needs involved with a drinking water emergency. Therefore, a key concept to the state response strategy is to ensure clear lines of authority and responsibility are defined. Mutual support and coordination with the various agencies is critical in ensuring an appropriate state response to a drinking water emergency.

The following core mission objectives were developed to ensure a successful response and recovery operation to a drinking water emergency:

- Coordinate and conduct situational assessment regarding the drinking water emergency
- Develop a unified management and response organization using the guidance found in this SOG in concordance with the KYEOP and NIMS
- Provide technical assistance and regulatory oversight
- Provide assistance with infrastructure restoration
- Provide accurate and timely information.

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## **2.0 MISSION**

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State agencies and cabinets will coordinate and synchronize state operations in order to mobilize and provide all necessary resources to a drinking water emergency in an expeditious and organized manner. Local requests for assistance will be supported as necessary to alleviate the incident consequences and encourage the recovery of the impacted area(s).

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## **3.0 CONCEPT OF OPERATIONS**

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The Commonwealth of Kentucky, and federal partners as requested, responds to notification of a disruption of drinking water service in a coordinated manner in keeping with the principles of NIMS. The basic operational phases of response include the emergency phase (including system assessment to identify the problem), monitoring and sampling (including field monitoring and screening to protect human health and the environment, as well as sampling and laboratory analysis), implementing identified corrective actions and, finally, restoration of drinking water service. Although this is an oversimplification of a sometimes complex and time-consuming effort, the intent is to capture the basic modes of operation that occur during an incident. Note that the phases often overlap, as depicted in Figure 3, indicating that operational phases rarely run chronologically (one finishes before the other begins) but usually occur in parallel with system assessment still underway while sampling commences and preliminary corrective actions are being put into place. Additionally, two consecutive days of clean samples are required (except in the case of Total Coliform failures only) prior to restoring drinking water service, which should factor into provision of supplemental drinking water when needed.

DEP intends to have a representative on-scene within two (2) hours of being notified of a disruption in drinking water service. As determined by factors at the scene, DEP could submit an Action Request Form (ARF) requesting federal assistance. Within eight (8) hours of notification, DEP will have alerted appropriate local, county, state and federal partners of the incident and provided a situation update, thus establishing a Unified Command to manage the incident<sup>4</sup>. The likely timeframe for receiving analytical results, from samples taken on the first day of the incident, is approximately forty (40) hours after initial notification. With specific actions depending on each individual incident, one of the final steps in the timeline to restoration of service is lifting any advisories that have been put into place.

KYEM fills multiple roles in disaster and emergency response. For incidents primarily involving drinking water, the likely actions will include facilitation of resource requests (if any), ordering supplemental potable water supplies, and establishing a plan for the distribution of that water. (Note that these actions, depicted in Figure 3, are represented with a dotted border indicating that they may not occur in every instance).

KDPH also has many duties in a drinking water incident, but the primary role listed in Figure 3 is inspecting public and commercial facilities that utilize potable water (including hospitals, restaurants, etc.)<sup>5</sup>. Field inspections are coordinated with and/or performed by local health departments.

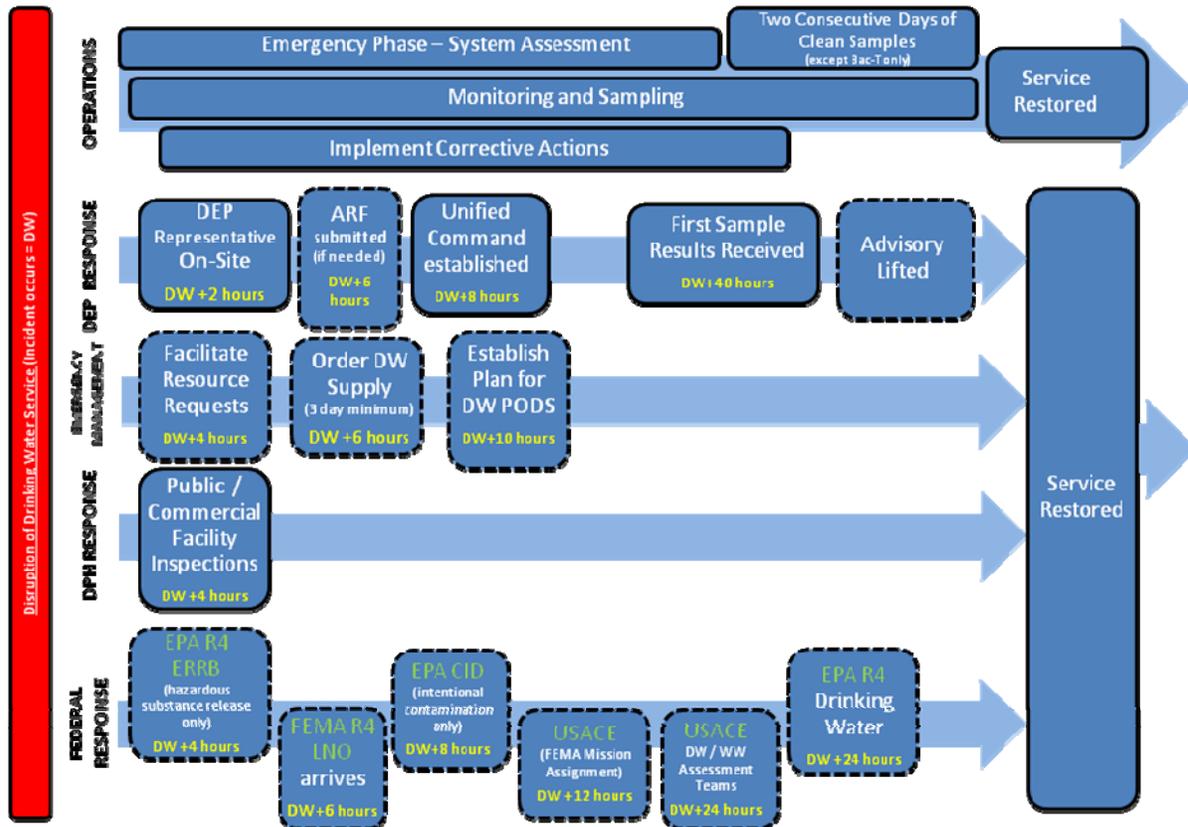
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<sup>4</sup> DEP and DPH have authored a guidance document entitled *Bulk Water Transporters during Drinking Water Emergencies - Sampling Requirements and Transport Responsibility*.

<sup>5</sup> DPH provides guidance for retail food establishments in *Water Emergency Operational Procedures for Retail Food Establishments* (revised 2007).

The U.S. Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA) and U.S. Army Corps of Engineers (USACE) may all play roles in the response, if requested. Figure 3 depicts some of the typical response missions along with an estimated timeframe for arrival of preliminary federal personnel.

Figure 3<sup>6</sup>  
Commonwealth of Kentucky and Federal Partner Response



### 3.1 Direction, Control and Coordination

A primary role of state government is to supplement and facilitate local efforts before, during, and after incidents. The Commonwealth provides direct and routine assistance to its local jurisdictions through emergency management program development and by routinely coordinating in these efforts with federal officials. The Governor coordinates assistance from other states through interstate mutual aid and assistance compacts, such as the Emergency Management Assistance Compact (EMAC). States within FEMA Region IV possess varying levels of capability, organic resources, pre-established response contracts and agreements. When it becomes clear that local and state capabilities will be insufficient

<sup>6</sup> This *Commonwealth of Kentucky and Federal Partner Response* figure is a general reference to primary activities for major stakeholders during a drinking water emergency.

or have been exceeded, the Governor requests federal assistance including, if appropriate, a Stafford Act Presidential declaration of an emergency or major disaster.

### **3.2 Situational Awareness**

It will become imperative during a drinking water emergency to ensure good situational awareness including the right information at the right time. Situational awareness refers to the continual process of collecting, analyzing, and disseminating intelligence, information, and knowledge to allow organizations and individuals to anticipate response requirements and to react effectively to those requirements. It involves an interactive process of sharing and evaluating information from multiple sources to include the fusion of domestic and international intelligence and operational reports into a coherent picture. It includes communications and reporting activities and tasks to forecast or predict incidents and to detect and monitor threats and hazards.

Situational awareness must start at the incident scene and be effectively communicated to the responsible state agencies. The awareness level will be greatly improved when experienced subject-matter experts identify critical elements of information and use them to form a common operating picture. For an effective state response, agencies must continuously refine the ability to assess the situation as an incident unfolds and rapidly provide accurate information to decision-makers in a user-friendly manner. It is essential that all state agencies share information in order to develop a common operating picture and synchronize their response operations and resources.

### **3.3 Data Collection and Information Management**

If possible, data should be reported in an electronic format that lends itself to being readily transferred into databases and geospatial software. The emphasis should be on rapidly and efficiently providing information to stakeholders in a visual format that allows for rapid, informed decision making. DOW has developed a one page Drinking Water Assessment form to encompass basic information about the water system and includes areas to note flooding impacts, damage to plant and/or distribution system, requirements for design engineering, etc. Records, including field logbooks, photographs, analytical data and other work products developed during a drinking water incident, should be maintained in accordance with DEP policy. DEP is also working with the Kentucky Infrastructure Authority to develop a web based data collection site for drinking water system through the Water Resource Information System (WRIS).

### **3.4 Alert and Notification**

Notification that drinking water service has been disrupted, or that a release to surface or ground water has occurred which may impact drinking water, may be reported through a local DEP regional office, county emergency manager, DEP ERT Hotline, Commonwealth 24-hour warning point (state EOC), or the National Response Center (U.S. Coast Guard).

All of these entities have agreed upon mutual alert and notification to facilitate activation of necessary resources. Typical operational flow can include a daily situation update (ie, conference call) in which DEP, DPH, KYEM and local entities, including the PWS, stay

abreast of daily progress. To further delineate areas of operation, DEP typically interacts with the PWS while KYEM typically interfaces with county elected officials. A unified command approach, in keeping with NIMS precepts, can be utilized to assure a coordinated response effort on behalf of the Commonwealth.

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## **4.0 AGENCY ROLES, RESPONSIBILITIES AND INTER-RELATIONSHIPS**

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### ***4.1 Aligned Capabilities***

State agencies involved in a drinking water emergency response have aligned their capabilities to protect the public and manage impacts. These combined capabilities provides for the expertise to design, implement, and interpret the results of environmental field surveys and laboratory sample analyses; develop protective guidance where none exists; and use available data and judgment to recommend appropriate actions for protecting the public and environment. In the case of a drinking water emergency, agencies assist and provide rapid needs assessments and comprehensive environmental health and risk assessments. They work closely with the health community to link exposures with predicted disease outcomes, provide input in the development of Crisis and Emergency Risk Communication (CERC) messages, provide guidance on personal protective measures, and advise on environmental health guidelines.

### ***4.2 Roles and Responsibilities***

#### ***4.2.1 Commonwealth of Kentucky Agencies***

DEP is the lead agency for coordination of incident response activities pertaining directly to drinking water systems.

##### ***4.2.1.1 Department for Environmental Protection***

###### ***Division of Water***

The DEP Division of Water (DOW) has interim primacy for implementing the requirements of the Safe Drinking Water Act (SDWA). DEP is also the main liasion to the the U.S. Environmental Protection Agency (EPA). SDWA is found in Chapter 6A of the Public Health Service, Section 300f. The following branches with drinking water responsibilities are under DOW:

**Compliance and Technical Assistance Branch:** Serves as the approving agency with regulatory authority for the SDWA, also provides technical subject matter expertise for a drinking water incident. Field personnel, including drinking water inspectors, are divided into ten regional offices across the state and serve as on-site support and sample collectors during drinking water incidents.

**Water Infrastructure Branch:** Maintains engineering plans for drinking water on a day-to-day basis and would provide subject matter expertise, including review of revisions to drinking water plans during an emergency.

**Watershed Management Branch:** Surface water and ground water impacts are evaluated in this branch, in addition to Geographic Information System (GIS) services for DOW.

## ***Division of Environmental Program Support***

The DEP Division of Environmental Program Support (DEPS) contains the following branches with responsibilities during a disruption of potable water supply:

**Environmental Response Branch (ERB):** Serves as the DEP coordination point during any type of environmental emergency, including management of the Environmental Response Center (ERC) and interaction with the State Emergency Operations Center (EOC). ERB also coordinates the three designated, trained responders in each of the ten DEP regional offices.

**Environmental Services Branch (ESB):** The DEP laboratory is managed by the ESB and is a fully certified drinking water lab in addition to performing some multi-media (air, water, waste) sample analysis.

### ***4.2.1.2 Division of Emergency Management***

The Kentucky Division of Emergency Management (KYEM), operating under KRS 39A, manages the state EOC and provides on-site coordination through Regional Response Managers located throughout the state. In the event of a disruption of potable water service, KYEM would potentially facilitate resource requests (including supplemental drinking water), coordinate Commonwealth resources and provides the State Coordinating Officer (SCO) during federally declared disasters.

### ***4.2.1.3 Department for Public Health***

The Kentucky Department for Public Health (KDPH) has multiple points of coordination in the event of a drinking water emergency, including inspection of public and commercial facilities (under KRS 217) and, if requested, provide technical assistance with private water wells.

### ***4.2.1.4 Kentucky Transportation Cabinet***

The Kentucky Transportation Cabinet (KYTC), as stated in the KYEOP, provides transportation and transportation management services under many types of disasters and emergencies. In a drinking water emergency, KYTC would be relied upon to coordinate transportation needs, including transportation of bulk water supplies.

### ***4.2.1.5 Kentucky Infrastructure Administration***

The Kentucky Infrastructure Administration (KIA), created under KRS 224A.030, maintains the statewide Water Resources Information System (WRIS) database. Additionally, KIA oversees project funding for drinking water grants.

#### **4.2.1.6 Public Service Commission**

The Kentucky Public Service Commission (PSC), primarily under KRS 278 and 279, provides inspections and regulates the rate structure of a portion of the water systems, including investor-owned, water districts and water associations. Notification to PSC, if necessary, would likely come from DOW.

#### **4.2.1.7 Kentucky Geological Survey**

The Kentucky Geological Survey (KGS) provides technical expertise in the areas of geology, water well placement and troubleshooting in addition to maintaining the regulatory groundwater data base.

#### **4.2.1.8 Kentucky Division of Plumbing**

The Kentucky Division of Plumbing, under the Kentucky Department of Housing, Buildings and Construction, is a supporting agency in the event of a disruption in potable water service. On a routine basis, the Division inspects and enforces residential standards in addition to enforcing cross-connection appurtenances. Notification to the Division of Plumbing, if necessary, would likely come from DOW.

#### **4.2.1.8 Kentucky National Guard**

The Kentucky Army National Guard (KYARNG) and Air National Guard (KYANG) provide multi-faceted support in the face of domestic emergencies. Specifically in a drinking water incident, the Kentucky National Guard could provide hazardous atmosphere entry team support (41<sup>st</sup> Civil Support Team) and bulk water supply logistics, in addition to material support for items such as portable reverse osmosis drinking water systems. Notification to the National Guard would likely come from KYEM.

### **4.3 Local and County Entities**

#### **4.3.1 Public Water System**

The mission of Public Water Systems (PWS) across the Commonwealth is to provide safe drinking water to their customers. In the event of emergencies involving their systems, PWS provide technical and operational expertise regarding the operations of their intakes, plants and distribution systems.

#### **4.3.2 County and Local Government**

County and local government entities and officials can authorize expenditure of local funds and exercise civil authority, including disaster declarations. If applicable in a given locality, county officials coordinate a water district's response to an emergency.

## **4.4 Federal Agencies**

### **4.4.1 US Environmental Protection Agency**

The U.S. Environmental Protection Agency (USEPA) Region 4 has three primary sections that could potentially interact with the Commonwealth:

**Emergency Response and Removal Branch (ERRB):** for drinking water incidents involving or resulting from the release of hazardous substances.

**Criminal Investigation Division (CID):** for intentional contamination incidents

**Safe Drinking Water Branch (SDWB):** if requested, can provide technical subject matter support at the state EOC or Departmental DOC, especially for events of long duration.

### **4.4.2 US Army Corps of Engineers**

The U.S. Army Corps of Engineers (USACE) Louisville District has provided engineering and technical assistance at the state EOC and Departmental DOC during incidents involving waste water and drinking water facilities. Additional, USACE can provide on-site assessment and major project management.

### **4.4.3 Federal Emergency Management Agency**

The Federal Emergency Management Agency (FEMA) facilitates requests for federal resources, including processing Action Request Forms (ARFs) and issues federal Mission Assignments (MA) under a declared emergency.