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# Business Continuity Planning for
# Water Utilities: Guidance Document

Web Report #4319

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## About the Water Research Foundation

The Water Research Foundation is a member-supported, international, 501(c)3 nonprofit organization that sponsors research that enables water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers.

The Foundation's mission is to advance the science of water to improve the quality of life. To achieve this mission, the Foundation sponsors studies on all aspects of drinking water, including resources, treatment, and distribution. Nearly 1,000 water utilities, consulting firms, and manufacturers in North America and abroad contribute subscription payments to support the Foundation's work. Additional funding comes from collaborative partnerships with other national and international organizations and the U.S. federal government, allowing for resources to be leveraged, expertise to be shared, and broad-based knowledge to be developed and disseminated.

From its headquarters in Denver, Colorado, the Foundation's staff directs and supports the efforts of more than 800 volunteers who serve on the Board of Trustees and various committees. These volunteers represent many facets of the water industry, and contribute their expertise to select and monitor research studies that benefit the entire drinking water community.

Research results are disseminated through a number of channels, including reports, the Website, Webcasts, workshops, and periodicals.

The Foundation serves as a cooperative program providing subscribers the opportunity to pool their resources and build upon each others' expertise. By applying Foundation research findings, subscribers can save substantial costs and stay on the leading edge of drinking water science and technology. Since its inception, the Foundation has supplied the water community with more than $460 million in applied research value.

More information about the Foundation and how to become a subscriber is available at **www.WaterRF.org**.

# Business Continuity Planning for Water Utilities: Guidance Document

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## DISCLAIMER

# CONTENTS

# TABLES

# FIGURES

# FOREWORD

The Water Research Foundation (Foundation) is a nonprofit corporation dedicated to the development and implementation of scientifically sound research designed to help drinking water utilities respond to regulatory requirements and address high-priority concerns. The Foundation's research agenda is developed through a process of consultation with Foundation subscribers and other drinking water professionals. The Foundation's Board of Trustees and other professional volunteers help prioritize and select research projects for funding based upon current and future industry needs, applicability, and past work. The Foundation sponsors research projects through the Focus Area, Emerging Opportunities, and Tailored Collaboration programs, as well as various joint research efforts with organizations such as the U.S. Environmental Protection Agency and the U.S. Bureau of Reclamation.

This publication is a result of a research project fully funded or funded in part by Foundation subscribers. The Foundation's subscription program provides a cost-effective and collaborative method for funding research in the public interest. The research investment that underpins this report will intrinsically increase in value as the findings are applied in communities throughout the world. Foundation research projects are managed closely from their inception to the final report by the staff and a large cadre of volunteers who willingly contribute their time and expertise. The Foundation provides planning, management, and technical oversight and awards contracts to other institutions such as water utilities, universities, and engineering firms to conduct the research.

A broad spectrum of water supply issues is addressed by the Foundation's research agenda, including resources, treatment and operations, distribution and storage, water quality and analysis, toxicology, economics, and management. The ultimate purpose of the coordinated effort is to assist water suppliers to provide a reliable supply of safe and affordable drinking water to consumers. The true benefits of the Foundation's research are realized when the results are implemented at the utility level. The Foundation's staff and Board of Trustees are pleased to offer this publication as a contribution toward that end.

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# GUIDANCE DOCUMENT OVERVIEW

Water and wastewater utilities throughout the water sector, which are collectively referenced as "water systems" or "water utilities" in this document, each need a Business Continuity Plan (BCP). A Business Continuity Plan's end goal is maintaining solid operations - financially, managerially, and functionally, after any incident. Utilities that operate other systems, such as gas and electrical, can utilize this guidance as well, although specific technical terminology may be different.

The *Water Sector Coordinating Council (WSCC) Strategic Roadmap*, which was published in October of 2008 by the Water Sector Coordinating Council (WSCC), listed the Top Priority Activities to significantly mitigate risk in the water sector. On this list was to "Provide guidance on business continuity/continuity of operations planning in the water sector." This Guidance Document and the corresponding Template and on-line training modules were developed in support of this activity. The EPA has determined the Key Features of an Active and Effective Protective Program, which includes "Prepare, test and update emergency response, recovery and business continuity plans." Further, a BCP is recommended as part of the ANSI/AWWA G430-09 Security Practices for Operations and Management Standard.
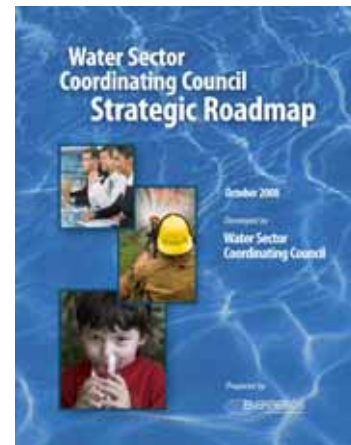
Appendix C contains a summary of the background research that preceded the development of this Guidance Document and Template. Appendix G provides a case study of an actual BCP development process by a water utility, the East Bay Municipal Utility District. The other Appendices provide information that may be useful in the development of a BCP.

## About the BCP Template

The Guidance Document is designed to be used with the corresponding BCP Template (referred to throughout this document as the Template) to assist users in the development of a BCP for a water utility. While the Template makes it easier for utilities to get started developing their own BCP, a BCP should be customized for a specific utility, as needed, so that it can be most effective. To further enhance an understanding of the Business Continuity Planning process, a series of video training modules was developed to accompany the BCP guidance document and template. These modules correspond to the various sections of the written materials. Users may view the entire video or select individual modules, as appropriate to their needs.

In addition to these tools, a Business Case Analysis tool was developed to assist utilities in evaluating the business case for developing a BCP. This tool is included as Appendix A, and is intended to be used by any utility needing to prove a return on investment for a BCP program.

The callout boxes throughout this document provide guidance on how to customize the BCP for any size of utility. The water drops throughout both documents help users keep track of information in the Guidance Document that corresponds to the Template. These drops should be removed from the final BCP after plan development.

A BCP is not meant to replace any other emergency management document, or to replicate any other document. It should complement and enhance a water utility's existing emergency management system as shown in Figure 1. Generally, the BCP will be a plan that pulls other existing plans together, although a water utility may choose to integrate their BCP into an existing plan or vice versa.



**Figure 1: BCP Relationship with other plans**

An emergency response plan (ERP) or similar emergency plan is a tool that "stops the bleeding," while a BCP is a tool that keeps the "heart pumping". Regarding the distinction between a BCP and a Continuity of Operations Plan (COOP), while there are historical distinctions, the two are increasingly interchangeable as more and more organizations plan for and mitigate disruptions to their operations. This Guidance Document and Template address the concepts of both BCP and COOP.

A list of plans that may complement the BCP are listed below in Table 1, and a glossary of notable types of preparedness plans is included in Appendix J.

| Type of Plan | Included Documents |
|---|---|
| Hazard Mitigation Plans | Vulnerability Assessment / Risk Analysis<br>Business Impact Analysis (BIA)<br>Impact Assessment<br>Hazard Identification<br>Risk Mitigation Plan (RMP) |
| Standard Operating Procedures to support Mission Essential Functions | Documentation Policy<br>Timekeeping Procedures<br>Safety and Security Plans |
| Preparedness Plans | Facility Response Plan (FRP)<br>Hazard-Specific Preparedness Plan (e.g., Hurricane, Flood)<br>Spill Prevention Control and Countermeasure (SPCC) |
| Response Plans | Emergency Response Plan (ERP)<br>Emergency Operations Plan (EOP)<br>Fire Evacuation Plans<br>Incident Management Plans<br>Crisis Communications Plan (CCP)<br>Point of Dispensing (POD) Plan<br>Hazard-Specific Response Plan (e.g., Flood, Tornado, Bomb-Threat, Water Quality Emergency) |
| Recovery Plans | COOP<br>Laboratory COOP<br>Pandemic Plan<br>Information Technology (IT) Disaster Recovery Plan (DRP) |

**Table 1: Plan Relationships**

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***Real World Examples of Where a BCP Fits Relative to Other Plans***

One large utility uses the BCP as their central plan, and includes other emergency management plans in the appendices of that central plan. During and after an incident, this one document has all of the needed information.

Another utility has the BCP as an annex to their ERP. This layout also allows users to access one document with all of the information that is needed in an emergency.

Many utilities have their ERP and BCP as separate stand-alone documents.

All three scenarios presented are effective because they were developed with the culture and needs of the respective utilities in mind.

## Why is a BCP critical?

Why invest in developing a BCP? Besides being a prudent business practice, some additional justifications for developing a BCP include:

- Address gaps in the existing emergency management system, particularly associated with financial and business functions of the utility.
- Pull together existing plans.
- Address an item that is listed as a "Top Priority Activity" in the WSCC Strategic Roadmap.
- Provide guidance for any interruption in business, such as power outages or supply interruptions.
- Provide policies and procedures restoring mission essential functions after an incident.
- Reduce downtime and associated costs.
- Strengthen a utility's ability to continue serving critical customers during an emergency.
- Improve resource management.
- Improve reputation management.
- Keep employees engaged and employed.
- Improve a utility's ability to survive through any size of incident.

## BCP Management System

A management system is the framework of processes and procedures used to ensure that an organization can effectively fulfill all tasks required to achieve its objectives. It is recommended that a business continuity program use a management system approach to ensure that the plan is effective and continually improved.

In supporting the management systems approach, the "Plan-Do-Check-Act" cycle is presented in Figure 2:

- *PLAN* – Establish management system policy, objectives, processes, and procedures relevant to managing business continuity risks and improving response and recovery processes that deliver results in accordance with the organization's strategic needs.
- *DO* – Implement and operate the management system policy, controls, processes, and procedures.
- *CHECK* – Monitor, assess, measure, and review performance against management system policy, objectives, and practical experience; report the results to management for review; and determine and authorize actions for remediation and improvement.

- *ACT* – Take corrective and preventive actions, based on the results of the internal management system audit and management review, re-appraising the scope of the business continuity management system and business continuity policy and objectives to achieve continual improvement of the management system.[1]

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[1] ASIS (American Society for Industrial Security) International and BSI (British Standards Institution). 2010. *Business Continuity Management Systems: Requirements with Guidance for Use.* ASIS/BSI BCM.01-2010. Approved November 2, 2010.
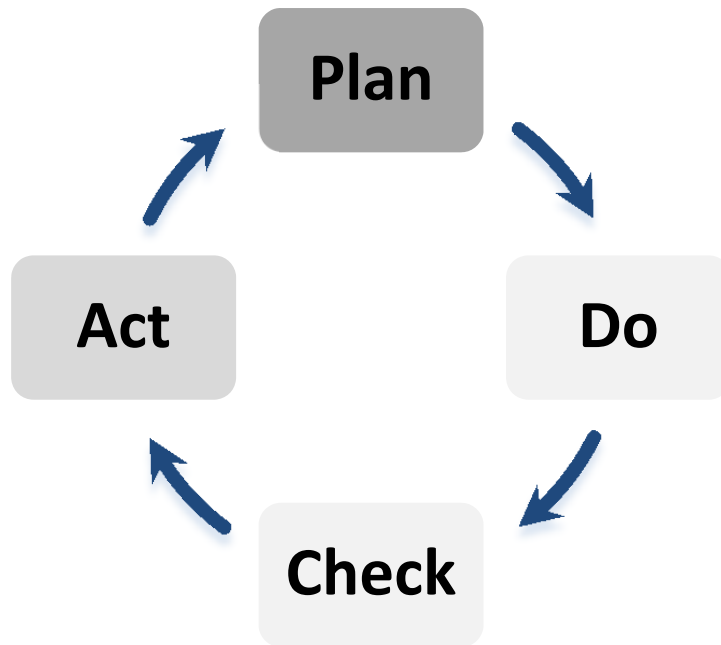
**Figure 1: Plan, Do, Check, Act Cycle**

## Culture

For business continuity planning to be effective and to meet the requirements of Section 4.1 of the ANSI/AWWA G430 Standard, it needs to become part of the utility's organizational culture.[2] Every organization, including water utilities, has a culture. Although culture is intangible and often taken for granted, it provides a core set of values and assumptions, and guides day-to-day activities of personnel in the workplace.[3]

Organizational cultures that have been developed over many years are generally difficult, but not impossible, to change. Certain conditions encourage change, such as turnover in leadership or experiencing a significant crisis, such as a catastrophic incident.[4] Too often, it is not until such an incident occurs that an organization changes their practices in emergency management and begins developing a BCP. In these cases, business continuity planning is typically embraced in earnest.

A catastrophic incident is not necessary to shift a culture. Once water utility leadership commits to developing a BCP, there are best practices to change the culture and make the plan more effective. Key practices to facilitate this shift include:

*Utilizing top management role models* – Employees will look to the behavior of top management as a benchmark. When senior management promotes business continuity planning for the sake of mission continuity and serves as active participants in the process, it provides a clear message to all employees.

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[2] BCI (Business Continuity Institute). 2010. *Good Practice Guidelines* 2010. Berkshire, United Kingdom: BCI.
[3] Deal, T.E., and Kennedy, A.A. 1983. Culture: A New Look through Old Lenses." *Journal of Applied Behavioral Science*, 19(4): 501.
[4] Chapter 16 of Robbins, S. 2003. *Essentials of Organizational Behavior*, New Jersey: Pearson Education, Inc.

5

*Encouraging employee participation* – Provide employees access to business continuity planning documents in accordance with security protocols and include employee representatives from all key business areas in business continuity planning meetings.

*Providing business continuity training* – Provide training, workshops, and exercises to communicate each employee's roles and responsibilities under the business continuity program.

*Recognizing value of business continuity* – After the BCP is activated during an exercise or real incident, it is important to review performance and provide constructive feedback to business continuity participants not only to develop recommendations for improvement, but also to recognize the value of past business continuity planning efforts.

It is important to remember that such cultural change needs to be measured in years, not months.

## Business Continuity Planning Committee

In most utilities, multiple people will need to provide input in the BCP development process. For the purposes of this document, the people providing input on the BCP Development are referred to as the Business Continuity Planning Committee. More guidance on the Business Continuity Planning Committee is provided in Section 2.0

## How to Use this Document and the BCP Template

The Guidance Document is meant to be used with the BCP Template and Video Training Modules. The information here should be used as guidance. Users should also think beyond the examples and suggestions given. Not all portions of this Guidance Document and the Template will apply to all water utilities. BCP developers should utilize what works best for them.

Each section of the Template corresponds to a section in this Guidance Document. This Guidance Document gives explanations, examples, and other information that helps developers of a BCP use the Template. It should be noted that there are call-out boxes throughout this document to provide guidance on how to scale certain aspects of the BCP depending on the size of the utility, or to provide real world examples of how different aspects of the business continuity planning process have been implemented by different water utilities. Additionally, certain supplemental materials that may help with the collection of information for the BCP development have been provided in the appendices of this document.

In the corresponding Template, there are empty tables and bullets. If additional rows are needed in the tables, hit the "Tab" key while the cursor is in the bottom right cell, and an additional row will appear. A checklist for the completion of the section is included at the end of each section of the Template – this is for the user's review, and is not to remain in the utility's final BCP document.

The appendices of this Guidance Document are to assist with the development of the BCP and do not correspond directly to the appendices of the Template, which are examples of supplemental materials for the BCP. Section 13 of the Guidance Document provides information on the development and

incorporation of the BCP appendices and annexes.  Appendix F of this Guidance Document addresses the maintenance of a BCP.

These documents are provided to assist with the development of a BCP to help utilities be more resilient in the face of sudden incidents that impact the utility and its mission essential functions.  The goal of these documents is to simplify the process, but input and evaluation by stakeholders is necessary for the BCP to be effective.

The remaining sections correspond to sections in the Business Continuity Plan (BCP) Template. The information here is designed to provide step-by-step guidance and assistance in the completion of the Template by a utility.
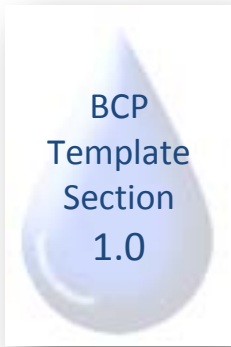
# 1.0    BUSINESS CONTINUITY PLAN INTRODUCTION

BCP Template Section 1.0

The introduction of a BCP should clearly spell out the purpose of the plan and give users an explanation of the BCP scope, legal background, usage, assumptions, and integration with other plans.

It is important that business continuity planning be integrated into a utility's culture and, as such, consistent with the utility's mission. Often, the utility's mission includes the provision of a reliable supply of high quality water. Thus, the purpose of the business continuity planning process should be defined with that in mind.

## Overview of a BCP

This section provides a quick overview of a BCP, its elements, and a short description of each element. The topics in the BCP should include:

- Concept of operations
- Mission essential functions (MEFs)
- Critical resources
- Vital records and data
- Alternate facilities
- Delegation of authority
- Succession planning
- Alert notification procedures
- Devolution
- Reconstitution
- Tests, training, and exercises.

## Scope

The scope of a BCP should be carefully defined and documented to ensure that all parties clearly understand what is being addressed in the BCP. The scope of the BCP includes the following considerations:

- Whole organization or selected units
- Locations (e.g., headquarters, all locations)
- Services (e.g., limited services or all services)

> **Tip for Small Utilities**
>
> While a small utility may only have a few employees and one facility, the scope should still be established to clearly define details such as the duration of disruption that the BCP is designed to address.

- Business functions (e.g., limited mission essential functions or all mission essential functions)
- Duration of disruption (30 days is recommended, but other durations can be selected).

The careful delineation of scope needs to be decided by the Business Continuity Planning Committee and approved by senior leadership.

During development of the BCP scope, the following guidelines should be kept in mind:

- Have the Business Continuity Planning Committee discuss and carefully define the BCP scope.
- Use existing risk assessments, lessons learned from real incidents and exercises, cost-benefit analysis, and other information helpful in delineating an appropriate scope for the BCP.
- Review all phases of the utility's operations to select which functions, services, and systems are mission-essential and therefore need to be addressed by the BCP.
- Carefully document the scope in the plan.

---

***Real World Example of Inadequate BCP Scope***

As part of a phased program for BCP development at one water utility, a BCP had been developed for a headquarters location, but not for water treatment plants. When an incident occurred at one of the water treatment plants, there was confusion because the plan was activated for an incident that was beyond the scope of the BCP, e.g. power failure to the water treatment and subsequent emergency generator failure. The utility subsequently expanded their BCP to include their water treatment plants.

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### Executive Policy Statement

Upper management at the water utility should endorse the business continuity program through issuing an executive policy statement. The policy should identify the mission of the water utility and define basic roles and responsibilities to keep the program effective. The policy should also provide specific staff with the authority to develop plans and implement recommended improvements.

### Hazard / Disaster / Emergency Incident Definition

In accordance with the National Incident Management System (NIMS), an incident is defined as an occurrence, natural or man-made, that requires a response to protect life or property. Based on this model and definition, most utilities have an Incident Management or Emergency Response Plan as the foundation for their comprehensive plans or their suite of emergency response plans. This consistent terminology is important as many plans "overlap", e.g., a fire incident could be a business interruption incident. In this Guidance Document, "emergency" and "incident" are often used interchangeably to encompass incidents ranging from small local emergencies to large regional disasters.

Many utilities have defined and categorized incidents as a function of size and complexity, thus reflecting the ability of an Incident Command System (ICS) to expand and contract. Different levels of incidents and the corresponding response procedures are typically categorized. Business disruption

impacts can be similarly categorized.  All utilities are encouraged to review the water-sector specific training on the use of ICS that is available from the EPA.  This incident definition may already be in an existing water utility plan such as an ERP.  It is important to have an incident management system in place prior to developing a BCP, as a BCP does not replace an ERP.

During plan development, the following guidelines should be kept in mind regarding the definition of an incident and the use of ICS:

- ICS is the organizational model that serves as the foundation for all emergency response plans, including business continuity plans.
- Some incidents will have overlap between plans, so the ICS needs to be reflected in all plans.
- Incidents need to be categorized based on size and complexity to facilitate expansion and contraction of the ICS.
- It is important to train employees in their roles in the ICS structure.

## Assumptions

It is important to document the assumptions upon which the BCP is based.  Several common assumptions are listed in the Template, but others may be applicable and should be included in the plan.

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***Real World Example of the Need for ICS Consistent Terminology in Emergency Plans***

One utility did not use ICS-consistent terminology in the planning documents. When an event escalated to the point that other emergency responders became integrated into the response activities, there was confusion with the terminology use, decreasing the effectiveness of the emergency recovery process.

---

## Integration with Other Plans

Business continuity planning is an integral part of the emergency management system, which typically includes a suite of plans for a larger utility or one comprehensive plan for a smaller utility. Examples of other plans that may be in place include the following:

- Standard Operating Procedures
- Emergency Response Plan or Emergency Operations Plan
- Fire/Evacuation Plans
- Safety and Security Plans
- Medical Emergency Response Plan
- Pandemic Influenza Preparedness Plan
- Hazard-Specific Preparedness Plans (e.g., hurricane, flood)
- Hazard-Specific Response Plans (e.g., flood, tornado, bomb-threat, drought, water quality emergency)

---

*Scalability*

The BCP should be integrated with other related emergency response plans. In a larger utility, it may be a suite of plans. In a smaller one, it may be part of one comprehensive plan.

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- Information Technology (IT) Disaster Recovery Plan (DRP)
- Department-specific plans
- Crisis Communications Plan
- Hazard/Risk Mitigation Plan.

The role of the BCP among this suite of plans is to specifically address the continuity of mission-essential functions and the resources that support those functions.

---

***Real World Example of the Need for Consistency between Various Plans***

One utility developed a BCP that became part of a suite of emergency preparedness plans. Within those plans, references to the other documents were incomplete. When organizational changes were made to the ICS model used, they were not consistently made within all the documents. Luckily, this was identified during a tabletop exercise rather than during a real event, and the utility was able to make the correction before it caused a real problem.

---

During plan development, the following guidelines should be kept in mind regarding the relationship between the BCP and other plans:

- Ensure that the BCP is consistent with other plans, such as Incident Management Plans/ERPs and the Crisis Communications Plan, all of which should be developed prior to a BCP.
- Consider the use of a graphic to present the BCP and its relationship to other plans, such as the one provided in Figure 1.

When making revisions to the BCP, check the other plans and coordinate revisions as necessary.

Plan appendices provide a suitable location for supporting components of the plan, such as contact lists, plan maintenance guidance, and other materials that do not necessitate inclusion in the body of the plan. Reasons for placing some materials in the appendices include:

- Keeping the body of the plan as streamlined as possible.
- Providing a location for information that requires frequent updates, so that the body of the plan does not need to be updated as frequently.
- Providing a secured location for information that poses security concerns or is not appropriate to distribute to all plan recipients.
- Facilitating updates without requiring the levels of approval needed for updates to the body of the document.

## Checklist

Does the BCP:

1. Define the scope?

    a. Locations served by the BCP?

b. Services addressed by the BCP?

c. Business functions addressed by the BCP?

d. Duration?

2. Establish written policy by the water/wastewater utility Executive(s)?

3. Define the Incident?

4. Provide basic assumptions?

e. Length of time to sustain?

f. Selected facilities to address?

g. Stated expectations for available training and routine testing?

5. Integrate with other plans?

Once the user is introduced to the BCP, the document introduces the user to the Concept of Operations which explains how and when the plan will be executed.
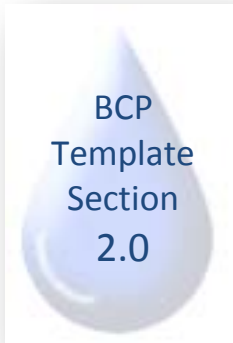
## 2.0   CONCEPT OF OPERATIONS

**BCP Template Section 2.0**

The Concept of Operations section of a BCP provides the structure and operational guidelines for using the BCP including the following:

- Roles and Responsibilities
- Plan Security, Accessibility, and Use
- Plan Activation
- Plan Deactivation

During development of the BCP Concept of Operations, the following guidelines should be kept in mind:

Have the Business Continuity Planning Committee discuss and agree on the concept of operations for the BCP.

Use prior vulnerability assessments and risk assessments to better understand how the BCP needs to be utilized to mitigate a business disruption.

### Roles and Responsibilities

#### Business Continuity Planning Coordinator

The water utility should appoint a Business Continuity Planning Coordinator to lead the development of the BCP and maintain the effectiveness of the plan.  Also, it is recommended that the Business Continuity Planning Coordinator hold regular meetings with the Business Continuity Planning Committee to garner support and coordination throughout the water utility organization.   This position is referenced frequently in the Template as a decision maker, leader, and coordinator of all BCP efforts.  If multiple people are to execute the duties of the Business Continuity Planning Coordinator, then alter the language provided in the Template to refer to the actual title of the position to execute the task.

> **Tip for All Utilities**
>
> Include representatives from each department at the utility in the BCP Committee as well as staff who are involved in risk assessments and risk mitigation.

#### Business Continuity Planning Committee

The water utility should establish a Business Continuity Planning Committee to provide direction for the BCP, its management, updates, and reviews.  Also, the Business Continuity Planning Committee should ensure that the BCP coordinates well with other plans, policies, and procedures, as well as risk assessments including vulnerability assessments and other documents and reports that support the mission of the water utility.  A table has been provided in Appendix D to list the Business Continuity Planning Committee Members.

#### Distribution List

One or more distribution lists should be developed to identify and document the parties who should receive a copy of the BCP.  It is recommended that copies of the BCP be made available to all employees

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of the utility.  Any sensitive materials can be placed in annexes or appendices that can be subject to less universal distribution.  If the decision is made not to distribute the BCP to all employees, a distribution list should be developed that includes all positions in the utility that have been designated as having key roles in a response.  In addition, it is important to consider outside agencies that should receive a copy of the plan.  They could include, but not be limited to, local first responder agencies, an external media consultant, and critical customers or suppliers.

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***Real World Example of Why to Utilize a Plan Distribution List***

One utility distributed their BCP through a formal process using the plan distribution list. They later handed out extra copies to a few individuals, without adding their names to the distribution list. Revisions and updates were made, but were only circulated to those staff positions on the list. When an event actually occurred, different editions of the plans were used, and it caused confusion and inefficiencies.

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### Plan Accessibility, Security, and Use

The utility may want to include a statement regarding the security and safety implications of the distribution of the BCP and/or the appendices and annexes to the BCP.  Distributing some of the information in a BCP (e.g., employee contact information), could compromise the privacy of the utility and the utility's employees. In addition, the disclosure of certain information in the plan could compromise the security of essential equipment, services, and systems of the utility, or otherwise detrimentally affect the ability of the utility to perform essential functions.

Portions of the BCP may contain information that raise personal privacy or other concerns, and those portions may be exempt from mandatory disclosure under the Freedom of Information Act (FOIA), 5 U.S.C. §552, 41 C.F.R. Part 105-60.  Also, be sure that accessibility conforms to local FOIA and sunshine laws (laws that require government information to be available to the public), as most protect against the release of sensitive critical infrastructure resource information.

The BCP Coordinator or designee needs to coordinate any decision regarding whether to disclose or withhold information in the plan from outside agencies.

The decisions that are made regarding security and accessibility should be taken into consideration when determining where the plan shall be stored.  Remember that electrical services may not be available when the BCP is activated.  Therefore resiliency in plan accessibility is recommended.

### Plan Activation

In the event of an incident, the Business Continuity Planning Coordinator, or other person with authority, determines whether to activate the BCP.  BCP activation may also require consultation with other parties that should be identified in the BCP.  BCP triggering incidents may include, but not be limited to, the following:

- Loss of a critical facility or equipment

- Loss of critical system or process
- Loss of critical material or supplies
- Loss or significant impact of communications
- Loss of electrical power
- Unavailability of personnel.

Figure 3 provides an overview of a response to an incident and where BCP plan activation falls following an incident.
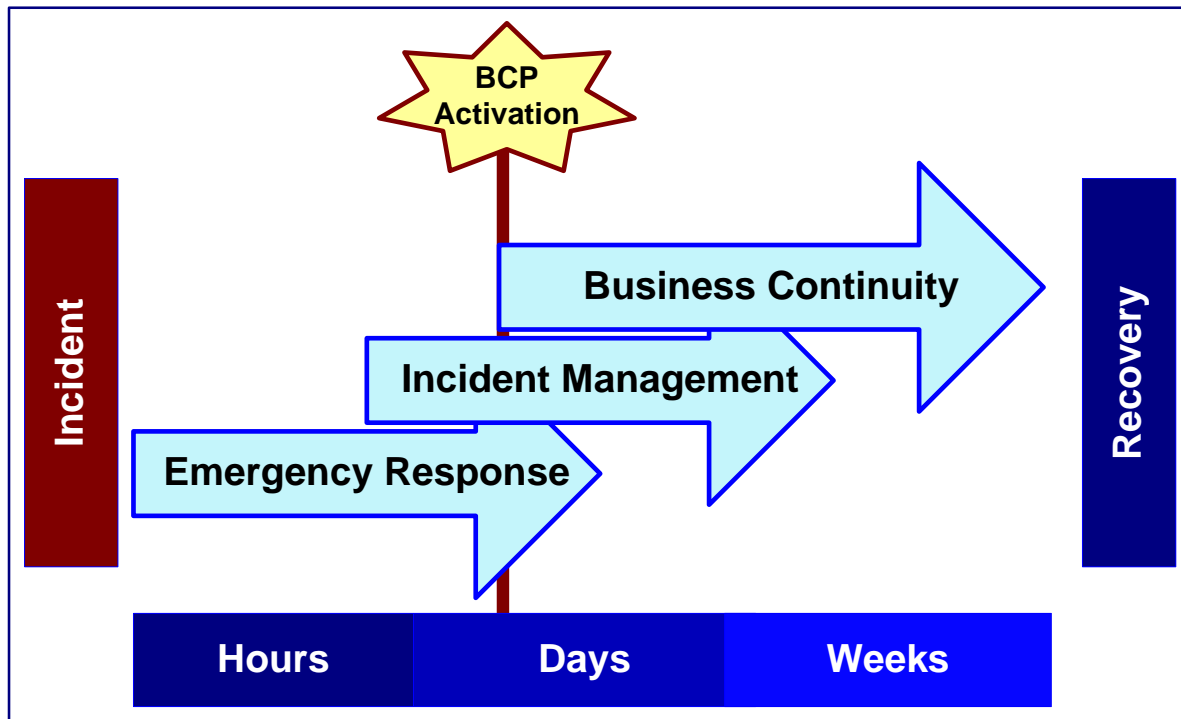
Plan Deactivation

In consultation with others as designated, the Business Continuity Planning Coordinator determines when to deactivate the BCP after it has been activated.  This decision is made based on their assessment that mission essential functions have been acceptably recovered.  The plan deactivation procedures are explained more thoroughly in Section 11.0, which covers reconstitution.

Checklist

Does the BCP:

1. Identify a Business Continuity Planning Coordinator and a description of his or her responsibilities?

2. Identify the Business Continuity Planning Committee and a description of their responsibilities?

17

3. Provide a distribution list for internal employees and external agencies?

4. Establish policies and procedures for use, security and storage of the BCP?

5. Establish procedures for plan activation and de-activation?

In this section the details of when the BCP will be used are explained and some roles were defined. The next section identifies the priorities of the utility through the establishment of mission essential functions.
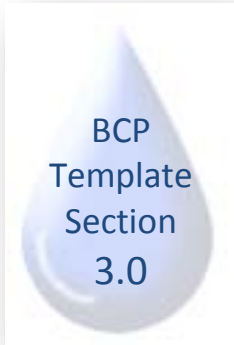
## 3.0   MISSION ESSENTIAL FUNCTIONS

**BCP Template Section 3.0**

This section of the BCP should identify and prioritize the Mission Essential Functions (MEFs) of the utility. Generally, MEFs for a utility are a limited set of the utility's functions that need to be continued throughout, or resumed rapidly following, a disruption of normal operations. The Federal Emergency Management Agency (FEMA) states that a "Continuity Plan should identify the components, processes, and requirements that ensure the continued performance of the organizations essential functions." [5]

For critical services such as those provided by the water sector, MEFs provide vital services, maintain the safety and health of the public, and sustain the industrial and economic base during a disruption.[6]

The reasons that a function may be essential are:

- The loss of the function would result in a threat to public health or safety.
- Irreparable damage to infrastructure or business will occur if the function is not performed.
- The function must be performed to adhere to federal, state, or local law.
- The loss of the function will result in widespread system disruption.

**Business Impact Analysis**

Many utilities that have identified hazards and conducted risk assessments of their entire system and operations will want to link their findings to the business continuity plan. This link is made through a Business Impact Analysis, or BIA. A BIA determines the impacts, or effects, of an interruption or disruption on the utility. Potential impacts include, but are not limited to those impacts on the following important mission attributes:

- Life safety and public health
- Water or wastewater service
- Consumer confidence
- Financial viability
- Regulatory compliance
- Contractual compliance
- Property protection
- Reputation protection.

For the purposes of this Guidance Document and the accompanying Template, the BIA is conducted through the identification and prioritization of MEFs as well as the supporting resources needed by the MEFs.

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[5] Federal Emergency Management Agency, Continuity Plan Template and Instructions for Non-Federal Entities, February 25, 2011

[6] Federal Emergency Management Agency, Continuity Guidance Circular 2- Continuity Guidance for Non-Federal Entities: Mission Essential Functions Identification Process, July 22, 2010.

## Identification of Mission Essential Functions

Some utilities have already identified many or all of their MEFs through a risk assessment, such as a vulnerability assessment (VA).

All department leads should be briefed on the definition of an MEF and asked to submit a list of candidate MEFs and their supporting activities for their departments. A short explanation of MEFs may be helpful in the decision-making process. Appendix K includes an example of a MEF questionnaire for potential distribution to departments.

The Business Continuity Planning Committee should review the entire list of MEFs submitted. It is important to understand the difference between MEFs and non-essential functions. MEFs are those functions that must be performed during emergencies, or immediately thereafter. All other functions that can be deferred until after the emergency should be identified as non-essential. Examples of MEF may include, raw water pumping, filtration and disinfection, finished water pumping, etc. Examples of non-essential functions might be meter reading, public education programs, and new project designs.

Water utilities will readily identify their core MEFs, such as production and delivery of safe drinking water. It is also important not to overlook support functions that may be MEFs within the 30-day timeframe, such as payroll and fueling for vehicles, equipment, and emergency generators, etc.

## Prioritization of Mission Essential Functions

The Business Continuity Planning Committee needs to then prioritize the list of MEFs based on the criteria listed in the BIA section above, as appropriate.

For the prioritization of MEFs, there should be a group of employees involved who understand each MEF, so that if a MEF is questioned, the importance of that function can be explained. This process can be one of the most challenging activities in the development of a BCP if too many people are involved or if the people involved are not thoroughly informed. It is also one of the most valuable components of developing a BCP. It is important to conduct a serious brainstorming of the core mission(s) of the utility and the functions that are genuinely essential to the mission. This prioritization is critical to capture what really matters to the fulfillment of the mission, but not to include functions that are not mission essential.

One successful way to prioritize MEFs is to write each MEF on an index card or self-adhesive note, and have the group sort the index cards or notes to develop the proper prioritization order. It may be easier if the MEFs are separated into time periods or tiers (if the BCP is using a tiered timeline, this can be incorporated in the MEF prioritization) based on Recovery Time

> **Tips for Small Utilities**
>
> The prioritization of MEFs may be very simple for a small utility, where one person can make the decisions. If the utility is part of a larger organization, such as a corporation or municipality, the BCP Committee may want to align the utility MEFs with the MEFs of the larger organization.

> **Tips for All Utilities**
>
> Identifying and prioritizing MEFs is an iterative process due to utility changes and lessons learned. It is a best practice for the BCP Committee to review and update the BIA on a regular basis (e.g., every five years).

20

Objectives described more below. It is also important in this step to consider internal interdependencies. For instance, the department that owns a particular support function may not give it high priority, but that support function may be critical to other high-priority MEF.

Recovery Time Objectives

As part of the BIA, each MEF is assigned its own Recovery Time Objective (RTO). An RTO is the maximum timeframe before the interruption or disruption of a MEF causes significant impact to the business and dependent resources requirements. RTO is sometimes also referred to as Maximum Tolerable Downtime (MTD). Table 2 shows some examples of RTOs for MEFs, but is not a complete list of all possible MEFs at a utility. MEFS are typically prioritized in relation to the RTO.

| RTO | Department | Mission-Essential Functions |
|---|---|---|
| 30 minutes | Communications | Provide visual leadership; communicate with employees about situation; customer relations |
| 4 hours | Treatment | Provide water treatment to produce potable water for consumption |
| 6 hours | Pumping | Pump treated water into the distribution system (based on limited system storage) |
| 8 hours | Distribution | Investigate and repair leaks that compromise the distribution system |
| 7 days | Finance and Administration | Distribute paychecks to employees |

**Table 2: Example Mission Essential Functions with Assigned RTOs**

Mobilization Requirements

Some functions are necessary in the activation and mobilization of recovery efforts. Keep these in mind in the development of MEFs. Examples include:

- Activation of outside contractors (new or established)
- Activation of the Emergency Operations Center (EOC).

Security and Safety Requirements

Although not usually considered an MEF, planning for continuity at the time of a disaster may require that plant safety and physical or information security be stated as essential to one or more of the MEFs selected. An example may be if there is a shortage of materials that are stockpiled on utility property, and

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***Tip for Small Utilities***

This section includes several topics that may not apply to a small utility. Keep in mind, if the utility has a few employees that do almost all the tasks, and if these employees are unavailable and others need to assume their position, it may be helpful to have some details that usually are not documented listed in this document for the sake of continuity.

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21

additional security is necessary to prevent theft.  If the situation is so perilous that it prevents executing the MEF, then security and/or safety factors may need to be considered and included as a stated part of that MEF.

## Internal Interdependencies

In all organizations, there are interdependencies between departments.  In the day-to-day functions, people may not realize upon whom they depend, and who depends on them.  It is crucial in the MEF identification and prioritization process to identify these interdependencies.  In some cases, these functions may be located in separate units of the municipality or other parent organization, necessitating that those groups participate in the development of the BCP.

Some examples include:

- Purchasing departments, which are necessary for any procurement of supplies or services
- Fueling capabilities, which are necessary for vehicles and equipment
- Equipment that may be served by the IT department in off-hours without the operator being aware
- Maintenance functions on which much of the mission-essential equipment is dependent.

## Final Prioritization Table

It may be helpful to list the possible disruptions with the MEF table, as shown in Table 3.  If this creates security concerns, it could be included as a secure appendix of the BCP.  This prioritization table is provided at the beginning of the Template for easy access, but is the result of the actions provided in later sections of the Template.

| Ranking | Department | MEF | Possible Disruptions |
|---------|-----------|-----|----------------------|
| 1 | Administration | Implement emergency procedures | Loss of personnel, loss of communications, lack of access to facilities |
| 2 | IT | Maintain communications equipment | Loss of electrical power, loss of equipment, lack of access to equipment |
| 3 | Operations | Distribution testing | Loss of personnel, loss of communications, loss of equipment, lack of access to testing sites |
| 4 | Operations | Respond to reports of leaks | Loss of personnel, loss of communications, loss of equipment, lack of access to system |

**Table 3: Example MEF Prioritization Table**
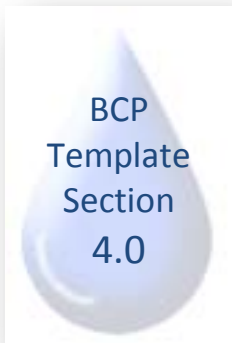
Does the BCP:

1.  List the MEFs in priority order?

2.  Clearly state RTOs for each MEF?

3.  List existing inter-dependencies?

After the MEF have been identified, it is important to identify what is needed to execute each MEF effectively. The next section, Critical Resources, identifies the systems, facilities, personnel, equipment, and materials that are necessary to fulfill the MEF.

## 4.0   CRITICAL RESOURCES

BCP
Template
Section
4.0

This section of the BCP identifies and addresses the critical resources needed to fulfill each MEF.  In order to be able to execute each MEF, it is necessary to identify and address all the critical resources needed to successfully accomplish each of them.  If the water utility has an up-to-date vulnerability assessment report, the critical resources may have already been identified.   The successful identification of all critical resources requires a detailed examination and brainstorming of the primary and secondary resources needed to fulfill each MEF.

This brainstorming process may also result in the identification of additional critical resources and MEFs that had not been previously identified.  For instance, a vehicle maintenance unit might not identify their tire repair shop as an MEF or critical resource.  However, following an incident like a tornado, critical vehicles will experience many flat tires and will become inoperable in the absence of a tire repair function.

Upon the identification of critical resources, provisions should be made to ensure their availability following an incident through such measures as:

- Redundant facilities, systems, and/or components
- Fixed and/or portable emergency electrical generators for power during outages
- Additional stockpiles and/or emergency contracts for critical chemicals
- Additional emergency repair materials and equipment, potentially stored at multiple locations
- Information Technology (IT) Disaster Recovery Plans (DRP) and back-up IT systems
- Two-way radio systems for use following cellular phone network overloads or failures
- Staff succession plans
- Plans for the utilization of special staff resources, drawing on cross-training, utilization of retired employees, and/or other special arrangements
- Emergency contracts for materials, equipment, and/or services
- Mutual aid with other utilities, such as through the Water / Wastewater Agency Response Networks (WARN).  Additional information on WARN is provided later in this section.

> **Tip for Small Utilities**
>
> This section includes many sub-sections to help all utilities identify critical resources.  These may all be relevant for even the smallest utility.
>
> Smaller utilities may not have backup resources readily available.  The BCP development process is a good time to identify outside sources, if needed.

It is recommended that critical resources be identified and grouped in the categories established in the National Fire Protection Association (NFPA) 1600 Standard on Disaster / Emergency Management and Business Continuity Programs, which are:

- Systems and Equipment

- Facilities (addressed in Section 6.0 of this guidance document)
- Materials and supplies
- Personnel.

The remainder of this section is divided into additional subsections on those four resource groups, as well as:

- Mutual aid and assistance
- IT.

## Systems

As identified in a BCP, a system is an assembly of permanent equipment and assets that work together to fulfill a MEF. Systems that have been identified for water utilities include:

- Water treatment – including source of supply, raw water pumping, and treatment plant
- Water distribution – including mains, pumps, and storage
- Sewer collection – including mains and pumps
- Reclaimed water treatment – including treatment and reclamation facilities, if applicable
- Support facilities – including operations and administration buildings
- Instrumentation and controls – including remote SCADA
- Communications – including land line and cellular telephone equipment, two-way radio systems, interoperable radio systems, and other specialized communications systems such as satellite phones, HAM radios, Government Emergency Telecommunications Service (GETS), and / or Wireless Priority Service (WPS)
- IT – including GIS and water system models.

Individual utilities may opt to delete some of these systems from their BCP or add other systems based on the specific nature of their process. For instance, in a system in which reclaimed water distribution is identified as a MEF, the reclaimed water distribution system would be a critical system. Some utilities may choose to break their systems down into smaller subsystems, such as breaking treatment into filtration, disinfection, etc.

Each of these systems includes many sub-systems and components. Each critical sub-system and component should be identified to address criticalities and potential single points of failure (SPF). Specific critical sub-systems and components will vary based on the specifics of each system. For instance, a reclaimed water treatment plant with storage capacity for 30 days of sludge, would probably consider solids handling a low priority.

## Equipment

Equipment is permanent, non-fixed assets that are necessary to the operations, maintenance, and repair of the systems, including:

- Vehicles – including cars and trucks

26

- Heavy equipment – including backhoes, loaders, and compressors
- Portable emergency electrical generators
- Tools
- Laboratory and analytical equipment.

It is helpful to list the quantity of each type of equipment that is needed and alternate options. For example, only two trucks may be necessary to perform the MEF, but a utility's fleet may contain several different vehicles that can serve the same role.

## Materials and Supplies

Materials and supplies are generally expendable and initially non-stationary assets that are critical for the continuation or restoration of MEF in a water system including:

- Chemicals for water and reclaimed water treatment
- Electrical power to run pumps and other critical system equipment
- Natural gas to provide heat where needed and occasionally to run emergency electrical generators and other processes
- Gasoline and diesel fuel to run vehicles, equipment, and generators
- Pumps and many other items to repair and maintain treatment systems
- Pipes, fittings, and many other items to repair distribution and collection systems
- Specialized materials to repair SCADA, communications and IT systems.

The need for these critical resources should be addressed through:

- Identification of interdependencies with other sectors, such as electrical power, and development of lines of communications
- Identification and assessment of supply chain risks
- Additional storage and inventories
- Alternate process options
- Special contracts and supplier / contractor relationships
- Mutual aid and assistance – discussed further in a later sub-section.

## Personnel

The final type of critical resources is personnel. Along with identifying and addressing critical systems, equipment, and materials and supplies, it is necessary to identify the types and numbers of personnel needed to fulfill the MEFs. Some of this information is gathered while preparing the MEF section of the BCP document, but will be incorporated in succeeding sections.

> *Tip for Small Utilities*
>
> If your utility has very few personnel, they may all be considered critical resources.

Personnel considerations related to MEF include:

- Identification of core and support mission-essential positions

27

- Identification of the expert knowledge and training that are mission-essential
- Establishment of rotational plans so the same personnel are not required for extended periods of time
- Establishment of up to three layers of back-up or alternate positions for each mission-essential position; the identification of these back-up personnel should focus on necessary skills and licenses; succession plans are discussed in Section 8.0 of this Guidance Document.

Provisions are also needed for delegation of specific authorities, which are addressed in Section 7.0 of this Guidance Document.

Another aspect of personnel preparedness is training, which is addressed in Section 12 and Appendix H.

Vital records are yet another form of critical resources that are addressed in Section 5.0 of this Guidance Document.

Finally, it is very important to prepare employees and their families for resiliency in the event of an incident. This is addressed in Appendix E.

> **Tip for All Utilities**
>
> Assigning mission-essential positions may pose overtime pay challenges, which may be addressed through pre-planning and active management.

## Mutual Aid and Assistance

It is critical that water utilities collaborate and build partnerships with other utilities to improve preparedness related to emergency response and recovery. In that regard, the water sector has formed the Water/Wastewater Agency Response Network (WARN) for mutual aid and assistance. State WARN programs provide a framework for intra-state mutual aid and assistance between water systems. Efforts are currently underway to improve access to inter-state mutual aid and assistance. In order to help facilitate aid from other sources, including through mutual aid, water utilities should be familiar with the lines of communications and protocols for working through their state and county emergency management agencies. In many states, WARN is represented in the state EOC to help facilitate mutual aid between water systems.

Water utilities should be familiar with and have contact information for assistance that may be available through Community Emergency Response Teams (CERT) and non-governmental organizations, such as the American Red Cross, the Salvation Army and others. In some areas, public-private partnerships are being used to address critical resources in disaster incidents. Participation in such groups can have many advantages in incident response.

> **Tip for Small Utilities**
>
> Carefully planning for mutual aid assistance, as described in this section, is particularly important for small utilities!

## Information Technology

IT systems have a presence in virtually all other systems. Information technology is a highly dependent infrastructure for the business associated with processing water resources, as well as payroll, contracts, and other administrative functions.

While this document is not intended to provide comprehensive IT DRP plan development guidance, some key development considerations include:

- Clearly establishing IT system security, mitigation, response and recovery policies
- Redundancy of critical systems, components and capabilities
- Interoperability between system components and between the primary and alternate locations
- Annual review and testing of plans capturing technological changes.

The BCP needs to give guidance that will prioritize recovery in coordination with the established MEF priorities. IT itself can be very dependent on specialized infrastructure, utility partners, and consultants. A vendor list of IT resources that are familiar with the utility and its infrastructure should be included in the BCP.

The ANSI/ASME-ITI/AWWA J100 RAMCAP® Standard for Risk and Resilience Management of Water and the Wastewater Systems (RAMCAP®) developed by the AWWA and ASME contains examples of a number of inherent threats regarding IT. The utility may have a DRP that addresses IT concerns and can be referred to by the BCP or the IT specialists in the utility may be deeply involved in the development of this section of the BCP. If a DRP is not in place, one should be developed to recover the IT applications that support MEFs.

Financial Resources

As part of the development of a BCP, utilities should ensure that they have sufficient financial resources in a bank account with optimum accessibility following an incident. Generally, the funds should be sufficient to cover any expenses that might be expected to arise for a period of thirty days.

Checklist

Does the BCP:

1. Identify resources critical to fulfill the MEF?

2. Create back-up plans for critical resources, as needed, including personnel?

3. Identify necessary back-up vendors and contractors?

4. Include mutual aid and assistance relationships?

    a. WARN

    b. Local government agencies

    c. First responders

    d. Local businesses and associations

    e. CERT

    f. Non-governmental organizations

5. Coordinate with the IT DRP?

With the MEF identified and the resources necessary for the execution of the MEF listed, the BCP moves to the protection of information that is important to the mission of the water utility.
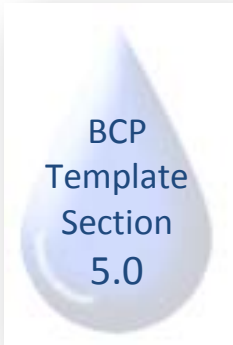
## 5.0    VITAL RECORDS AND DATA

Vital records, data, and other information are critical and often overlooked resources of a water utility. Although they are a form of resource, like the critical resources addressed in Section 4.0 of this Guidance Document, they are addressed separately here because of their unique nature. It is of critical importance to ensure accurate identification, protection, availability, and access during emergencies and recovery periods. This includes vital records, databases, information systems, and associated equipment needed to perform MEFs. Some records and data carry specific legal retention requirements.

Typically, vital records are paper or electronic. However, today electronic forms may include databases, websites, software, equipment, portable drives, and other storage media and off-site secure storage. The records are vital if the utility will be negatively impacted by their loss. Protection must include consideration of very sensitive information such as risk assessment and personal information of customers and employees. To the extent possible, agencies should pre-position vital records and data at one or more alternate facilities and update duplicate records or back-up electronic files on a regular basis.

Examples of the diverse types of critical records and data in a water utility include:

- Distribution and collection system maps and supporting information
- Facility plans and drawings
- Customer information
- Legal documents, such as contracts, mutual aid agreements, and deeds for properties and easements
- Vendor/supplier information
- Employee information
- Emergency contact information
- Standard procedures
- Legal, financial, and compliance reporting data
- Equipment maintenance information.

> **Tip for Small Utilities**
>
> It may not be financially feasible to back up all information for all utilities. During the BCP development process, consider options that would back up vital records, such as teaming with other utilities or the local municipality.

Key steps for addressing vital records in BCP development include:

- Assign responsibilities for vital record protection and management.
- Identify policies, procedures, and vital records inventory forms that address the tracking and replacement requirements of vital records.
- Ensure that identified vital records are evaluated as necessary for emergency operations and to protect the rights and interests of citizens and the government.
- Identify records that are necessary for continuation of MEF activities, such as the documents listed earlier in this section.

- Prepare for availability and appropriate access at the alternate operating location and/or EOC.
- Safeguard legal and financial records essential to the preservation of the legal rights and interests of the water utility, customers, and employees.
- Ensure vital records are easily retrieved and properly maintained.
- Ensure that a current inventory of vital records is readily accessible.
- Outline procedures for and prioritize the recovery of vital records during an emergency.
- Ensure that damage to vital records during an emergency is minimized and plan for mitigation in the event of damage.
- Provide procedures for the recovery of damaged records (paper and electronic).
- Replicate agency servers at an off-site facility.
- Scan all paper records and store on a secure computer.
- Convert vital records to microfilm, digital, etc.
- Duplicate all records at the time of their creation with "back-up" copies.
- Store duplicate records in fireproof file cabinets, vaults, and safes at the primary facility and, if possible, at an off-site facility.
- Protect off-site facilities from all hazards.

Another form of vital records is the records of the resources expended in the response to an incident that may be eligible for FEMA reimbursement. It is important to have guidance in the BCP or elsewhere for all employees to document hours worked and the tasks that were completed in the event that the incident is declared a major disaster and is eligible for Public Assistance Funding. Additional guidance on documentation requirements for FEMA reimbursement is on the FEMA Public Assistance Program website at: http://www.fema.gov/government/grant/pa/index.shtm.

Checklist

Does the BCP:

1. Identify vital operational records?

2. Identify vital legal/financial records?

3. Establish alternate locations for storage of data and records?

4. State appropriate procedures for mitigating damage, pre-positioning, or transport of vital records?

5. Provide documentation guidance that meets FEMA Public Assistance Disaster Reimbursement Grant requirements?

The next section of the BCP addresses the fact that regular work space may not be available after an incident, therefore the MEF may be moved to alternate facilities.
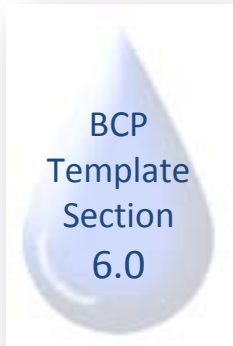
# 6.0    ALTERNATE FACILITIES

This section of the BCP addresses the identification of and procedures for moving to alternate facilities in the event that a disaster or emergency prevents the use of a facility such as:

- Office space
- Warehouse and/or storage space
- Vehicle repair facility

In the situation that a primary facility is unavailable, the BCP should direct users to the appropriate alternate facility for these business functions.  This section may not address every specific alternate location, but instead provide guidance regarding the utilization of existing space, available alternate spaces, and how the designation of space will be executed.

## Pre-established Facilities

If any existing facilities or agreements/contracts are already in place with pre-established work facilities, list those in this section. Some examples include:

- Existing facilities owned by the utility, or other offices or locations within the utility
- An agreement with a local municipality to use work areas
- An agreement with a private company to use office space or mobile units as needed.

## Emergency Acquisition Protocols

In the event that a pre-established facility is not available, new work areas may need to be procured.  The BCP should list the protocols necessary, or arrangements in place, to utilize these emergency acquisition protocols.  These may include:

- Contracting authority details
- Real estate contacts
- Location requirements and limitations, such as adequate space, provisions for emergency power, communications and IT infrastructure
- Adequate and appropriate space.

> **Tip for Small Utilities**
>
> Even though the only facility for some smaller utilities is the treatment plant or operational center, it is important to consider the functions that occur on-site, such as record keeping and business management, which may need to move to an alternate location, perhaps even to the private residence of the employee(s).
>
> Even for small utilities, pre-established facilities are a best practice for call centers that facilitate communication between the utility and its customers.

## Tele-working

If employees are available to accomplish their duties from home, then teleworking may be a viable option after an incident.  Some considerations to include in the BCP for teleworking are:

- Networking infrastructure, such as virtual private network (VPN) Access
- Communication
- Changes in work documentation procedures
- Other resources needed.

## Relocation Procedures

Relocating to an alternate facility involves more than the employees arriving at a new location.  Common workspaces require many aspects, and certain considerations may need to be kept in mind, such as:

- IT requirements
- Communication needs
- Documentation
- Power supply
- Equipment
- Space assignment procedures.

> ***Tip for All Utilities***
>
> It can be a challenge to reconcile and recover data from the emergency state, where data was modified at the alternate site, back to normal at the permanent site.  Pre-planning may help ease this transition.

## Checklist

Does the BCP:

1. List the alternate facilities available to continue MEF?

    a.  Are specific alternate facilities identified?

    b. Are redundant systems listed?

    c. Tele-working?

2. Establish procedures for relocation?

    a. Networks?

    b. Communication?

    c. Documentation?

    d. Power?

    e. Space allocation and workstation assignments?

    f. Health and welfare of employees?

g. Additional physical security and access control?

3. Establish emergency acquisition protocols?

Now that the MEF have been identified and the resources and priorities set, personnel decisions need to be made in the event that employees that regularly have responsibilities in the execution of MEF are not available. The first of these decisions is the delegation of authorities.
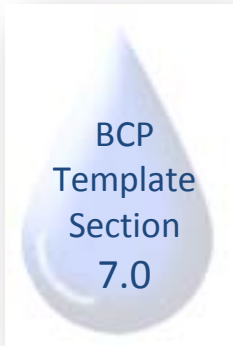
## 7.0    DELEGATION OF AUTHORITY

**BCP Template Section 7.0**

This section of the BCP establishes delegation of authority to selected employees if needed in the event of a BCP activation. The difference between the delegation of authority discussed in this section and succession planning addressed in Section 8.0 is that delegations of authorities do not include the transfer of the full responsibility of a position that normally accomplishes them, but allows the delegated employee to perform specific tasks. Some delegations of authority will be primarily operational in nature, while others, such as contract approval, have greater legal considerations. A common example of a basic delegation of authority is to empower first-line supervisors who are normally authorized to purchase items of up to $50 in price, to be able to purchase items of up to $500 in price. Not all tasks need a delegation of authority, but some that may include the following:

- Purchasing
- Contract signing
- Payroll approvals
- Hiring of employees (permanent or temporary)
- Reporting requirements
- Releasing public statements
- Contacting health authorities
- Coordinating mutual aid.

When developing delegations of authority, the following guidelines should be kept in mind:

- Follow NIMS and ICS guidelines.
- As much as possible, use titles rather than actual names, such as authority to sign contracts defaulting to the Assistant Director, and then the lead engineer, etc.; all titles should cross-reference to current names in a contact list in an appendix of the BCP.
- Be sure not to have all authorities defaulting to the same person.
- Keep employees informed if they are expected to take on an authority, and train them on how to perform that authority.
- Make sure that all delegations of authority are at least three personnel deep, if it involves a critical support function.
- Consider using positions at more than one location to increase the resiliency of the plan.

> **Tip for Small Utilities**
>
> Many of the MEFs are accomplished by one person in a small utility. In these cases, authorities may need to be delegated to personnel outside the utility, such as local municipal officials or a trusted person from another utility.

Does the BCP:

1. Designate any authorities required to sustain MEFs?

2. Provide up to three alternates for each authority?

Now that the delegations of authority are determined, the second major factor regarding personnel in the execution of the BCP are orders of succession.

# 8.0    SUCCESSION PLANNING

BCP
Template
Section
8.0

This section of the BCP establishes succession plans, which may be needed in a BCP activation. It is important to know that the purpose of succession planning within the context of a BCP is to document back-up personnel for individuals that perform time-critical activities or make time-critical decisions. This does not replace official long-term management succession plans.

Succession plans are needed for specific positions with key legal or operational roles or authorities that are critical to the mission of the water system. Succession planning is the determination of who will take over the position of an incumbent should they become unavailable or incapacitated for an unacceptable period of time. The lines of succession are different from the delegation of authority discussed in Section 7.0, in that the person taking over the role takes over the entire responsibility of the missing position, rather than just the ability and permission to accomplish one or more particular tasks. Not all positions may need a line of succession, though it may be more than managerial roles that need to be evaluated. Some positions that may need a line of succession are:

*Tip for All Utilities*

Look beyond top managers when planning succession. Include key operations individuals who, if they were unavailable, would cause a delay in recovery.

- Utility Director
- Public Information Officer / Public Relations Specialist
- IT Manager
- Safety Manager
- Plant Superintendents
- Plant Operators
- Inspectors
- SCADA Technician
- Utility Crew Leaders
- Maintenance Technicians.

During succession planning, the following guidelines should be kept in mind:

*Tip for Small Utilities*

In smaller systems, it may require greater creativity to identify persons to whom succession can be passed.

Consider personnel from other utilities, private contractors, municipal officials, and retired employees.

- Follow NIMS and ICS guidelines.
- Use titles rather than actual names, such as the Director position defaulting to the Assistant Director, and then the lead engineer, etc. All titles should cross-reference to current names in a contact list in the appendix of the BCP.
- Identify the duration of time that an incumbent is unavailable or incapacitated that may trigger the succession process.
- Be sure not to have all positions defaulting to the same

39

person. For instance, if the Director and Assistant Director are unavailable, the lead engineer may not be able to fill both duties.

- Keep employees informed if they are expected to fill a role, and train them on how to perform that role.
- Make sure that all lines of succession are at least three personnel deep.
- Ensure that succession plans are known in advance by employees to prevent surprises in the event of BCP activation.
- Consider using positions at more than one location to increase the resiliency of a succession plan.

> **_Tip for All Utilities_**
>
> During succession, responsibility transitions from one person to another. If responsibility is retained by the original person, then succession has not taken place.

## Checklist

Does the BCP:

1. Clearly establish a successor for management positions?

2. Establish 3 levels of successors for those positions?

3. Provide and establish a system for documentation of training for the additional responsibilities?

4. Comply with statutes and regulations?

The next section moves on from the details of the MEF execution, and explains the alert notification process.

# 9.0   ALERT NOTIFICATION PROCEDURES

**BCP Template Section 9.0**
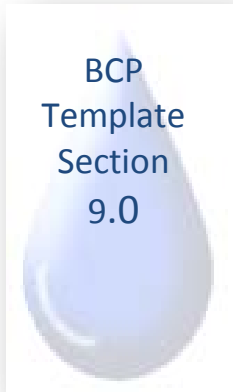
This section of the BCP establishes alert notification procedures for business continuity and references the Crisis Communication Plan. The Crisis Communications Plan supporting the BCP should address all internal and external communication needs after an incident. This section in the BCP needs to address how to contact staff to alert them of the following messages at a minimum:

- Inform them that the BCP is activated
- Provide situational awareness
- Inform them of special assignments under the BCP
- Provide information on when and where to report.

## Internal Call Tree

Within the organization, staff needs a way to gain access to information during and after an incident such as reporting to work, special duties, and availability of resources. An internal call tree, or other notification mechanism, should be listed in this section. It is important to have land line telephones available, in case cell phone towers are not in service. If the actual list of names and numbers is kept outside of the BCP, this section should direct the user to the appropriate place to find these lists. The utility should make plans to inform employees without communication that is dependent upon electricity. The utility should consider battery or generator back-up for communication equipment.

> ### BCP and the Crisis Communication Plan
>
> The BCP is not meant in any way to replace the Crisis Communication Plan. Prepare the BCP to complement the organization's CCP, and refer to the CCP rather than "reinventing the wheel."

> ### Tip for Small Utilities
>
> As long as there is more than one employee at a utility, provisions need to be made for communication, which may include in-person notification at the employee's home.

## External Communications

External communications should be addressed in a Crisis Communication Plan (CCP). While most external communication is handled through the PIO to the media, it is important to keep in mind that external key contacts may need to be aware of the situation. These contacts are appropriate to list within the BCP.

## Additional Modes of Communication

Redundancy in communication planning is critical, and multiple ways of contacting employees may be necessary. Direct users to other forms of communication in this section such as:

- Phone

- Email
- Text
- Emergency notification system
- Social Media
- Intranet
- Specific television or radio stations
- Face-to-face.

Checklist

Does the BCP:

1. Establish plans and procedures for rapid notification of the Business Continuity Planning Coordinator?

2. Establish internal phone trees and/or other mechanisms for notification?

3. Establish a method for communication of:

   a. BCP activation?

   b. Reporting locations and instructions?

   c. Special assignments?

   d. Specific threat conditions?

4. Direct users to the CCP or provide information on developing public announcements concerning public health issues that match the CCP?

While the proceeding sections should provide the guidance for executing the MEF in most situations, there are extreme situations where one more step is necessary for the utility to function after or during an incident. The next section, Devolution, addresses this situation.
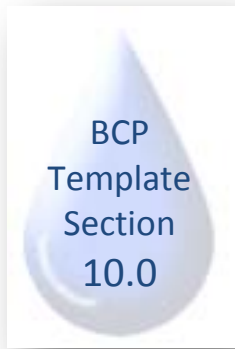
## 10.0  DEVOLUTION

Devolution is what will happen if all of the best planning efforts are not sufficient, and administration and rights, powers, property and responsibility must be transferred to an outside entity. Questions to be addressed are:

- What will happen in the utility if all the best planning efforts are not sufficient?
- Who will step in to maintain the public health?

In most utilities, the procedures for devolution are provided by state statutory regulations.  Consult state legal requirements in order to determine the necessity of this section and its requirements in the BCP.  A devolution template is also available from FEMA.

Checklist

Does the BCP:

1. Provide guidance that would direct users to devolution procedures, or provide devolution procedures that meet regulatory requirements?

The main details of the BCP are complete at this point, but a few sections are necessary to provide a plan that will have all the details needed to return to normal operations. The next section, Reconstitution, gives some guidance on this process.

43

## 11.0 RECONSTITUTION

Reconstitution includes the policies and procedures to return to normal operations once the Business Continuity Planning Coordinator and others in authority determine that normal business operations can be resumed. Reconstitution includes:

- Reclamation of legal rights, property, and powers
- Resumption of normal operations
- Readiness to resume statutory obligations and responsibilities.

### Recovery Process Considerations

Considerations for the recovery process that need to be included in the BCP include:

- Procedures for notification of employees, customers and authorities of the return to normal operations
- Protocols for restarting equipment and controllers at the primary facility/facilities and for transporting staff, if necessary
- Accounting for equipment, vehicles and supplies that may have been moved to alternate facilities
- After-action reporting.

It is important to account for all employees throughout the recovery process. Clear communication should be established with personnel, dependents, customers, local or regional government, and regulatory authorities with repeated notifications of resumption and "All Clear" announcements. Procedures to augment staff should be developed as may be needed due to incapacitation or loss of available labor force.

### Local Government

Local government should be kept informed of the status of recovery at all points in the reconstitution process. Local authorities will coordinate first responder activities. Coordinate all protocols with the county Emergency Management Agency.

### Returning to Primary Operations

Procedures should be established to transition data, vital records, and databases back to the primary facility or operation. Security of the data, at reconstitution, should also be restored to its original level. Each MEF will require treatment in the reconstitution protocol so that employees, customers and authorities are confident of complete restoration. If an authority has legally transferred statutory responsibilities, the alternate utility must be legally relieved.

At the conclusion of any BCP activation, an after-action report (AAR) should be compiled that captures and documents successes, challenges, lessons learned, and improvements needed.

Does the BCP:

1. Establish procedures for reporting on the status of essential assets?

2. Establish priority and procedures for assessing and making repairs on essential facilities?

3. Establish procedures for accounting for all employees during the recovery process?

4. Provide procedures for retrieving statutory responsibilities and authorities?

5. Assign who will coordinate and oversee orderly return to primary or new facilities?

6. Assign who will coordinate and assist employees?

7. Establish procedures for reporting and replacing lost/damaged equipment?

The only thing left for the BCP to be a complete document is that a plan is developed to keep it up to date and to make sure the users are prepared!

## 12.0   TESTS, TRAINING, AND EXERCISES

BCP
Template
Section
12.0

A critical component of any preparedness planning process is tests, training, and exercises (TTE).  The primary goal of a TTE and evaluation process for the business continuity program is to confirm that employees know what to do in an emergency to maintain and protect the public health of the community with a continuous, stable supply of clean drinking water. To this end, it is a best practice to include these plans within the framework of the BCP.  The purpose is to inform knowledgeable staff that the information and resources they require is in place to implement the BCP.    Orientation, training, tests, table-top exercises, and operational exercises are ways to introduce continuity concepts and develop familiarity and expertise with the implementation of the BCP.  The BCP should include an annual schedule for training, tests, and exercises.  The schedule is used to budget for employee time, training area, and facilitation, if necessary, and significantly contributes to continuous improvement.

> *Detailed information on Tests, Training and Exercises can be found in Appendix G*

The main body of the BCP is complete!  Of course, there is information that shouldn't go in the main document or may need further elaboration.  Therefore, one more section is included in this Guidance Document for the completion of the Appendices.

## 13.0 DEVELOPMENT OF APPENDICES

The appendices included in the Template are guidance for the appendices that may need to be included, based on the material in the previous sections that corresponds with each appendix. Based on the accessibility and security decisions made in Section 1.0, a utility may decide to include different information as an appendix or annex to the document.

The recommended appendices are:

- Business Continuity Planning Committee Members

- Employee Preparedness

- Plan Maintenance

- Tests, Training and Exercise Procedures and Records

- Vital Records and Data

Examples of documents to include as annexes are the documents listed in Table 1 that complement the BCP.

If the utility has a laboratory COOP separate from this plan, but sure to include it as an appendix or annex to this document. EPA Guidance on the development of a laboratory COOP is provided by the Water Laboratory Alliance.

The following appendices do not directly correspond to the Template, as they are additional information that may be necessary for the development of a BCP, but do not need to be included in a BCP.

## APPENDIX A.    ESTABLISHING THE BUSINESS CASE

Sometimes it is only after a disaster that the investment in a business continuity plan (BCP) produces a financial return. After a disaster takes place, the return is significant in terms of "avoided costs." However, developing and maintaining a BCP can be justified because it is the right thing to do.

The decision to develop a BCP may raise questions from stakeholders, such as governing boards and customers, and a more detailed and financially based business case may be necessary. This section provides a proven step-by-step process and examples to help utility personnel and emergency managers make a business case for business continuity planning in their utility.  Water utilities may use the costing worksheets provided by inserting their own specific utility information to consider existing risks and the potential costs of and revenue losses from those risks.  Worksheets are provided to identify alternative business continuity planning investments and the associated costs of implementation for comparison. The worksheets may be used to provide executives, boards, and others in a leadership capacity with convincing reasons to develop and maintain a BCP, based on information specific to their utility.

It is important to note that while some risks and associated costs can be quantified, many of the risks that can be mitigated through business continuity planning cannot be easily quantified.  Mitigated risks may include improving the ability to maintain essential services during disasters and increased consumer confidence.   In addition, some utilities may benefit from marketing the process improvements to be realized by completing the business continuity planning process.

> ### Tip for All Utilities
>
> The biggest hurdles to BCP buy-in include the following two beliefs:
>
> 1. Denial of risks, "It's not going to happen here", and
>
> 2. Minimization of risks, "This worst-case scenario is exaggerated, I don't buy it."

While not all water utilities may need to go through this step-by-step process to make the business case, this methodology is designed to provide guidance for use by water utilities of any size, from small to large.

### Understanding the Business Case

The term "business case," is commonly applied to a wide spectrum of needs. For this discussion, a business case will answer the question, "What happens if we take this course of action?" (Harvard Business Review Press, 2011) Making the business case for developing a BCP in the water sector, will also demonstrate value.

Considering how other sectors have addressed the business case for business continuity planning, it is important to note that the primary variations in making the case for business continuity planning depend on the level of regulation involved.  For example, business continuity planning in the energy sector and the banking/finance sector is heavily regulated, resulting in a lighter burden in developing a business case.  In sectors without aggressive business continuity planning regulations, the business case is made based on a combination of best practice and a return on investment.

51

Based on proven best practices, the seven steps to developing a business case are:

Step 1: Define the Opportunity

Step 2: Identify the Alternatives

Step 3: Gather Data and Estimate Timeframe

Step 4: Analyze the Alternatives

Step 5: Make a Choice and Assess the Risk

Step 6: Create a Plan for Implementation

Step 7: Communicate the Business Case[7]

The seven steps are discussed as applicable to water utilities in the following sections.

### *Step 1: Define the Opportunity*

The primary opportunity is to minimize any potential downtime to operations or disruption to the business side of the utility through business continuity planning.  Minimizing disruptions is consistent with the mission of any water utility that includes the provision of a reliable supply of high quality water for customers.

To define the opportunity, make the connection between business continuity planning and how the plan sustains or maximizes revenue, improves customer satisfaction, and enhances consumer confidence. Consider additional opportunities based on geography, customers, and other considerations.  Questions to assist in making this connection include, but are not limited to, the following:

What is the water utility hoping to accomplish through BCP?

Who is the water utility serving by maintaining a BCP program?

An example of a water utility defining the opportunity is:

*"The opportunity for the water utility is to confirm that critical functions essential to providing a reliable supply of quality water to its community could be sustained in an emergency.  If the opportunity moves forward, the maintenance of a business continuity program at the water utility would be designed to serve consumers, the community, investors, and staff."*

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[7] Reprinted with permission from: "Developing a Business Case: Expert Solutions to Everyday Challenges" Harvard Business Review Press, 2010.  Copyright (c) 2011 by Harvard Business Publishing; all rights reserved.

### Step 2: Identify the Alternatives

In moving forward with the development of a BCP and associated maintenance, there are alternatives that should be clearly identified for further evaluation. An integral part of that evaluation process is exploring the suitability of different alternatives with an emergency management oversight and advisory committee, whether it is a committee for a large utility or key staff and a board of trustees for a smaller system.

Identify the approaches to business continuity planning that water utility personnel can consider. The primary alternatives that are being assessed are whether to develop a BCP or whether to continue without one. Five example alternatives of business continuity planning approach decisions for consideration are:

> Include business continuity components in an existing emergency management plan or develop a stand-alone plan (e.g., possible decision for small water utilities)

> Develop just the BCP and maintain it annually or develop the BCP and a management system with monthly steering committee meetings and regular exercises

> Develop a BCP over a two or five-year period

> Manage the business continuity program through hiring new staff, a contractor, or utilizing existing staff

> Continue without a BCP

While the last option this is not an alternative promoted by these materials, this should be addressed as one of the alternatives in the business case analysis and could be a possible legitimate decision for small water utilities.

As part of the decision-making process, there should be dialogue with stakeholders, such as key staff, the governing board, regulatory agencies, and major customers. Stakeholders that join in the process early tend to be more supportive throughout the process. It is important to listen to their thoughts and incorporate their advice, as appropriate.

Additional sources of data may come from state drinking water programs, Federal Emergency Management Agency (FEMA), Environmental Protection Agency (EPA), American Water Works Association (AWWA), the Water Research Foundation, State WARN programs, and others as appropriate for guidance, training and tools that would be useful. Step 3 provides a list of data sources. Other utilities and neighboring water utilities may provide quality information through their programs and lessons learned.

### Step 3: Gather Data and Estimate Timeframe

It is important to gather tangible and intangible cost data in support of alternatives identified in Step 2 and in estimating the level of effort necessary for implementation of a BCP. Critical information relates to the risks that a water utility must integrate into the planning process. The water sector must not only

plan for administrative business functions but also for the resiliency of critical infrastructure. It is advisable to discuss the data collected with the oversight committee so that the data collected for the business case is sufficient to address their primary concerns.

Information to assist in gathering data to analyze the alternatives in the next step includes, but is not limited to, the following:

List of applicable and identified hazards and threats at the water utility

Risk assessment reports and associated corrective action plans developed using a risk screening tool, such as Risk Assessment Methodology for Water Utilities (RAM-W™), Vulnerability Self-Assessment Tool (VSAT™), or the Risk Analysis and Management for Critical Asset Protection Standard for Risk and Resilience Management of Water and Wastewater Systems (RAMCAP)

EPA's Community-Based Water Resiliency (CBWR) Electronic Tool for sharing information and building awareness of existing resources

EPA's Water Health and Economic Analysis Tool (WHEAT) to estimate costs for a utility and communities in the event of loss of water service for a specified period of time

Incident investigation reports including near misses at the utility

Damage assessments

Staff discussions and meeting minutes regarding risks to systems, equipment, personnel, materials and supplies

Lessons learned from other water utilities

A facilitated workshop for the water utility key personnel to identify business interruption risks and their potential impacts up to a full-scale business impact analysis

Additional research on possible approaches to the business continuity planning process, including outreach to utilities that have relevant experience and to industry experts

Valuable information in making the business case decisions is provided by estimating a timeframe for implementing each alternative.

### Step 4: Analyze the Alternatives

In examining the alternatives to developing a BCP, it is important to correlate the utility's risks and the potential effects on business continuity with the potential cost of each alternative identified in Step 2. Steps for analyzing each alternative include:

> **Tip for All Utilities**
>
> Remember to include on-going maintenance costs of a BCP to protect the initial investment in business continuity planning and to maximize and continue the effectiveness of the plan.

54

Tangible costs and benefits:

Costs of implementing the business continuity planning alternative

Costs of not conducting business continuity planning

Costs avoided by conducting business continuity planning

Estimate when anticipated cost savings are expected

> ***Examples of Cost Savings***
>
> **Short-term**: Implementing a succession plan with knowledge retention practices produces a benefit immediately when a key staff member suddenly retires or becomes incapacitated.
>
> **Long-term:** Enhanced ability to continue service and communicate with employees and customers during every power and communications outage.

Intangible costs and benefits:

List the impacts on other corporate metrics, (e.g., maintained consumer confidence)

- List any unquantifiable benefits and costs (e.g., reduced duration of business interruption)

Once the tangible and intangible costs and benefits are identified, organize the information and conduct a business impact analysis, as appropriate.  The Cost and Benefit Worksheet in Appendix B of this document may be used as a worksheet for each alternative.

Appendix B provides a business case tool to capture the benefits of various business continuity planning alternatives. On a granular level, the benefits are reduced losses for each alternative.  It is not the intention of the business case tool to quantify each and every potential loss and translate it into to specific monetary savings. However, specific financial analysis is a possible approach.  For the majority of water utilities, a more reasonable approach is to aim for a rough estimate of potential losses to use as leverage for the business case.

As the alternatives are assessed, it is helpful to focus on a most-probable worst-case business interruption scenario.  While scenario planning typically is not useful in business continuity planning, it may be useful in developing a business case.  If the utility has not performed a Vulnerability Assessment (VA), some example most-probable worst-case scenarios include, but are not limited to the following:

Loss of water or reclaimed water treatment for a defined period of time

Loss of a set percentage of employees for a defined period of time

Loss of service area for a defined period of time

Total loss of revenue for a defined period of time

Some monetary costs may be identified in this step. However, many of the benefits associated with business continuity planning are not quantifiable due to unknown factors such as precise frequency and severity data for business interruption risks.  The costs of gathering this missing data and conducting a

detailed business impact analysis will likely be too high to justify for most water utilities. If this is the case, a qualitative analysis of benefits will likely be more advantageous than a quantitative evaluation of costs.

The costs of each alternative should be identified in specific monetary amounts including initial and recurring costs of implementing each alternative. See the Business Case Tool in Appendix B for ideas on how to implement this analysis.

### *Step 5: Assess the Risk and Make a Choice*

Using the cost and benefit worksheets developed in Step 4 and a water utility-specific list of selection criteria, choose the best alternative for the water utility. Example selection criteria include the following:

Life safety (e.g., fire-fighting capability, provision of safe drinking water)

Continued water service

Property protection (e.g., financial viability)

Consumer confidence

### *Step 6: Create a Plan for Implementation*

When planning the implementation of a BCP, it is important to conduct the following activities:

Determine funding sources

Develop business continuity planning milestones and assign a timeframe and responsible person for each milestone

Identify the associated resources needed to develop and implement a BCP

Document results of the business case

### *Step 7: Communicate the Business Case*

Communication is the final step to developing a business case. In doing so, it is critical that return on investment (ROI) be effectively communicated to decision-makers and then subsequently realized and shared. Communication should include presenting both tangible benefits that are quantified as well as intangible benefits. It is important to share the utility's message and present it in a way that is most suitable for the higher-level decision-makers. In some cases, this means summarizing the results of detailed calculations for a simplified explanation to key stakeholders.

Moving forward from the Business Case Analysis

### *Understand and Track the Actual Costs of Interruptions to the Utility*

As the business case is developed, it will become obvious that there is opportunity to better understand and track the true and complex costs of a business interruption, such as:

If critical chemicals are not pre-purchased and stored ready for use, there could be complications with vendors and transporters, which could result in higher costs. In one recent boil water incident, there was need for a tanker of chlorine, however there were delays with the immediate transport due to related insurance issues. These types of dependency hazards can result in additional costs that might not have been previously considered in the planning process.

If an interruption to the water utility has a high impact to the community and the business continuity planning includes significant errors and omissions, litigation costs could be multi-faceted and significant. The costs include not only the dollar amount of the lawsuit, but also extensive legal support time and internal staff time. If critical customers, such as healthcare facilities or industrial customers are impacted; there could be a cascading effect to people, such as patients in healthcare facilities, or to critical production lines due to inadequate water quality and/or quantity. If so, this could also lead to litigation costs.

If there is an impact to the financial and accounting systems, including payroll and/or procurement of supplies, there may be hours lost.  Hours lost, while difficult to quantify, would be cumulatively significant, and therefore, important to quantify to the extent possible.  Such incidents could also lead to the loss of valuable employees that seek other employment because of the lack of payment.

There is a recognized need to better quantify costs at both individual facilities and across the sector. For future business case evaluations, a utility should ensure their ability to track these costs in the future.

### *Understand and Track the Actual Cascading Costs to the Community*

Similarly, there is need to better understand and track the true costs to the community, as it can have a profound effect. Tools such as EPA's CBWR electronic tool are helpful in assessing a water customer's resiliency to water service disruptions and learn about tools and resources that can be used to enhance resiliency.  Potential customers impacted by water-related incidents include, but are not limited to:

- Acute health care facilities
- Nursing and rehabilitation centers
- Colleges and universities
- Research laboratories
- Schools and daycare facilities
- Industry
- Lodging establishments
- Restaurants
- Entertainment venues (e.g., sporting arenas, concert venues, theaters)
- Retail establishments
- Office complexes

Acquisition of the data can be complicated by litigation and validation needs.

57

### *Understand Indirect Community Impacts*

When examining the effects of a business interruption of the utility on a community, it is important to consider the point at which the community cannot return due to sustained losses and delayed recovery. If lifelines to a community, such as a water system, have a prolonged interruption as from a natural disaster, it can impact other sectors through critical interdependencies. Small businesses can be particularly vulnerable, which can result in the overall degradation of a community as businesses close and significant portions of the population relocate. With a population decline, there is a reduced customer base for the utility, which will adversely impact revenues upon restoration of service. While this is an extreme scenario, it does happen. This type of scenario can result from longer term outages associated with disasters and should be factored into an analysis.

### *Sharpening the Business Case*

Given the variation in size and complexity of water utilities, there is an opportunity to take the methodology presented above and refine it for a utility and community. This would allow the BCP to be based on the individual characteristics of the system and the community served. The more specific the application, the more powerful the output will be in making the business case.

### *Potential Future Water Sector Research*

 A detailed examination of the business case specific to a number of selected utilities that have had interruptions, both in terms of interrupted water supply and quality (e.g., a boiled water order) may be helpful to the water sector.  This examination could include costs on behalf of the water utilities, as well as cascading costs to the community.  This will help individual water utilities conduct their own business case analysis based on real data from other systems that have experience with most-probable worst case scenarios.

# Business Case Tool

**Step 1.  Define the Opportunity:**

_____
_____

**Step 2.  Identify the Alternatives:**

| No. | Alternative | Initial development timeframe | Maintenance timeframe |
|---|---|---|---|
| 1 |  | • | • |
| 2 |  | • | • |
| 3 |  | • | • |

**Step 3.  Gather Data and Estimate Timeframe:**

Summary of data:

_____
_____
_____
_____
_____

Most-probable worst case scenario:

_____
_____

59

**Step 4. Analyze the Alternatives:**

Develop a cost and benefit analysis for each alternative using the worksheet provided on the next page.  Based on a review of gathered data from Step 3, list the assumptions for the cost and benefit worksheet below:

- _____
- _____
- _____
- _____
- _____

60

# Cost and Benefit Worksheet

Alternative: _____

| | Tangible costs | Tangible benefits | Intangible costs | Intangible benefits | Timeframe for costs | Recurring costs of implement-ation | Timeframe for recurring costs |
|---|---|---|---|---|---|---|---|
| Utility Revenue | | | | | | | |
| Payroll | | | | | | | |
| Overhead | | | | | | | |
| Overtime Payroll | | | | | | | |
| Equipment | | | | | | | |
| Materials | | | | | | | |
| Systems | | | | | | | |
| Equipment | | | | | | | |
| Vehicles | | | | | | | |
| Facilities | | | | | | | |
| Professional Services | | | | | | | |
| Insurance Premiums | | | | | | | |
| Liability/Litigation | | | | | | | |
| Other Operations | | | | | | | |
| Community Revenue | | | | | | | |
| Bond Rating | | | | | | | |
| Other - | | | | | | | |
| **Total** | | | | | | | |
| **Comments on intangible costs** | | | | | | | |
| **Comments on intangible benefits** | | | | | | | |
| Return on Investment = (Benefit – Cost)/Cost | (Note:  Keep in mind that intangible costs and benefits do not weigh into a calculation, they must be discussed qualitatively.) | | | | | | |

61

## Step 5.  Make a Choice and Assess the Risk:

### Alternative Comparison Worksheet

| No. | Alternative | Costs | Benefits | Risks | Ranking |
|-----|-------------|-------|----------|-------|---------|
| 1 | | | | | |
| 2 | | | | | |

## Step 6.  Create a Plan for Implementation:

List funding sources:

_____
_____
_____

### Implementation Worksheet

| Milestone | Timeframe | Responsible Person | Resources |
|-----------|-----------|--------------------|-----------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Business Case**:

_____
_____
_____
_____
_____

**Step 7.  Communicate the Business Case:**

_____

_____

_____

_____

_____

**APPENDIX C.        SUMMARY OF BACKGROUND RESEARCH**

In the development of this document a white paper titled *Project 4319: Business Continuity Plans for the Water Sector Background Research White Paper* was written by the project team, capturing BCP best practices in the water sector and other sectors.  The full contents of this paper can be acquired from the Water Research Foundation.  This section reviews some of the notable highlights from that research.  Many best practices noted in the white paper are incorporated elsewhere in this Guidance Document and the corresponding Template.

## Project Background

Incidents in the past decade have raised national awareness that hazards are in constant flux.  Incidents that our society had not imagined, such as the terrorist attacks on 9/11/2001, and incidents that our society had not planned adequately for, such as Hurricane Katrina, have brought us to a new paradigm as we prepare for future incidents.  As a critical infrastructure, the water sector bears a significant burden to continue operations during conditions resulting from all types of hazard incidents.  Recognizing this responsibility, many water utilities have covered significant ground over the past decade in conducting vulnerability assessments and other risk assessments to better understand their risks.  They have decreased risk by implementing risk mitigation plans to minimize the frequency and/or severity of possible incidents and the subsequent impacts.

For those risks that are beyond reasonable prevention, many water utilities have developed ERPs and conducted associated training of their staff.  Much of the impetus for this work was prompted by the regulations resulting from the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (or Public Law 107-188).  This act contains an amendment to the SDWA, Section 1433, "Terrorist and Other Intentional Acts" that directs U.S. community water systems serving populations greater than 3,300 to prepare or revise existing ERPs that include, at a minimum, plans, procedures, and equipment that can be used to obviate or lessen the impact of an attack on the system.  Some water utilities have also developed other plans, including Continuity of Operations Plans (COOP), which focus on operational recovery.

While these plans are essential and help increase the resilience of water utilities, there is a recognized need to plan for business interruptions in the wake of disrupting incidents from all-hazard conditions and return to normal as soon as possible.  However, BCPs are not currently required for water utilities.  Some water utilities, particularly the largest and most forward-thinking, have developed BCPs, but most have not.  The Water Research Foundation has undertaken this project to develop tools that will make it easier for utilities to develop BCPs.

## Approach

The BCP literature review was approached in four primary ways:

- Overall BCP Guidance Document research

- Water sector BCP literature research

- Utility surveys

- Non-water sector BCP research

The project team was composed of subject matter experts who have developed BCPs in different critical sectors and reviewed published guidance for universal materials to be considered.  Simultaneously, the 28 participating utilities participated in a web-based survey to contribute their experiences, or lack thereof, regarding BCP development, usage, and satisfaction.

The AWWA and EPA materials that have preceded this project were also reviewed to assess the status of the water sector.  Other select critical sectors were evaluated to identify the historical incidents, lessons learned, and best practices of those sectors.  These materials were evaluated to determine applicability and value to the water sector.

## BCP Guidance Documents

As business continuity planning has evolved throughout the world, it has resulted in government and professional organizations developing guidance documents and standards. These documents and standards include models and best practices that are relevant to the business continuity planning needs of the water sector.   These include but are not limited to:

- *FEMA's Continuity Guidance Circular 1 (CG1)*

- *FEMA's Continuity of Guidance Circular 2 (CG2)*

- *Homeland Security Exercise and Evaluation Program (HSEEP)*

- National Fire Protection Association (NFPA) 1600 *Standard on Disaster/Emergency Management and Business Continuity Programs*

- *ASIS SPC.1- 2009, Organizational Resilience Standard*

- *British Standard (BS) 25999-1 Business Continuity Management – Part 1: Code of Practice*

- *BS 25999-2 Business Continuity Management – Part 2: Specification*

- ASIS International and BSI joint American National Standard*, Business Continuity Management Systems: Requirements with Guidance for Use*

- ISO/PAS 22399*, Societal Security-Guideline for Incident Preparedness and Operational Continuity Management*

- Business Continuity Institute *Good Practices Guidelines*

## Status of Water Sector

Recognizing the emerging need for BCP guidance in the water sector, AWWA developed and presented a series of seminars on BCP for the sector in 2007 and 2008.  While the purpose of the project was to conduct two-day seminars, it was necessary to do considerable developmental work on the seminar

66

material.  This project helped lay the groundwork for future BCP education projects, such as this Water Research Foundation project.

The EPA provided a *Summary of Anecdotal Information of Examples of Business Continuity Planning in Selected Sectors* to the Water Research Foundation in February of 2011 for informational purposes.  In this report:

EPA performed a limited review of BCP best practices in five critical infrastructure sectors: Energy, Financial, Food and Agriculture, Health and Human Services, and Emergency Services. Through a series of informational interviews with sector representatives and an internet-based research effort, conducted in spring and summer 2010, EPA compiled anecdotal information that identifies current BCP practices across these sectors. EPA Water Sector partners may leverage this information and integrate these practices into BCP efforts specific to drinking water and wastewater utilities.

There are many ways in which the FEMA is involved in preparing for and responding to an emergency in the utility industry.  FEMA developed the NIMS and ICS training programs, which established universal standards for incident management and response with an all-hazard approach.  NIMS and ICS support a framework that helps facilitate the implementation of a BCP.

In addition to offering training in NIMS and ICS, FEMA provides guidance and templates for COOP programs.  These COOP templates provide a framework similar to what is necessary for effective water sector BCP development.

The JANSI/ASME-ITI/AWWA J100 RAMCAP® Standard for Risk and Resilience Management of Water and Wastewater Systems (RAMCAP®) is a refined vulnerability assessment methodology specific to the water sector. It is the first voluntary consensus standard encompassing an all-hazards risk and resilience management process for use specifically by water and wastewater utilities.

## Survey Findings

As part of gathering information on BCP practices in the water sector, 26 participating utilities were surveyed regarding their services, preparedness plans, and practices.  The participating utilities provide an array of water related utility services to their respective communities.  The 26 utilities that responded to the survey provide 88 utility related services to their communities.  The major categories of services provided are water production, water distribution, wastewater collection, wastewater treatment, and storm water management.

Based on information gathered from the survey, each of the participating utilities has each been impacted by one or more types of disasters in the recent past.  The most common incidents that utilities have experienced included power outages, severe winter weather, flooding, and hurricanes.  These disaster experiences will help the participating utilities draw upon first-hand experiences as they work with the project team in the development of a successful BCP tool.

Common impacts from these disasters included a loss of power, the inability to treat water and/or the contamination of water that was already treated.  These types of impacts interrupt the ability of the utility to provide service to its customers.

The majority of the participating utilities have one or more plans in place that are designed to deal with emergency situations. Eight utilities have existing BCPs and five have COOPs. Other utilities indicated that, although they do not have any specific continuity plans in place, other existing plans, such as an ERP, had some components of what a BCP would contain.

The majority of the participating utilities have trained their employees in emergency preparedness and response. 81 percent of the utilities that responded to the survey had provided some level of training in disaster preparedness. The majority of those responding had received training in ICS and/or NIMS.

Prior to the development of this white paper, five example plans had been received from the participating water utilities. Due to the sensitive nature of the materials, not all utilities were able to provide the documents for the project team to review. The emergency planning documents provided were analyzed to determine the common elements in the different plans. This review included BCPs, as well as ERPs, EOPs, COOPS, EAPs, and other various emergency plans. The FEMA COOP Template and Idaho COOP Guidance Document were also evaluated.

In an effort to lessen the frequency with which these plans need to be revised, it is common to have information that may change regularly in the appendices of an emergency planning document. The Comparison of documents illustrates that many materials, such as the Mission Essential Functions, Critical Resources, and Personnel lists, are referenced in different locations by different utilities. Sometimes these documents are in the appendices, and sometimes they are in the body of the text. Standardization of the location of information may make BCP documents more universally usable by personnel.

## Best Practices in Other Sectors

The energy sector's top priorities are protecting the nation's power grid and ensuring a reliable supply of electricity. Their focus on reliability, resiliency, and recovery takes into account an all-hazards approach, recognizing risks from natural hazards (such as hurricanes or geomagnetic disturbances) to intentional cyber-attacks.

Protecting the grid requires a coordinated effort among electric companies, the federal government and the suppliers of critical electric grid systems and components. In reviewing the business continuity elements for this sector, one of the best practices identified was the coordination between the governing organizations. Another best practice in the energy sector is the development of a business continuity committee, comprised of representatives from utilities around the country. The mission of the Business Continuity Steering Committee is to develop and advance the leadership of electric utilities with respect to operational continuity, resiliency and prompt restoration of electric service.

One last best practice in this context is that the NERC, DHS and the National Infrastructure Advisory Council have collaborated to outline the definitions and categories for core business priority designations. Core business is defined as Tier 1 Critical, Tier 2 Essential, Tier 3 Important, and Tier 4 Supplemental. These designations are becoming increasingly utilized across the electric industry as a best practice and guideline to standardize their all-hazards planning.

In the healthcare sector, a notable best practice included the identification of eleven essential infrastructures and services to maintain business in the period of 30 days after an incident. They include UT Police, Facilities, IT/Communications, Office of Institutional Advancements Communications Team (ability to transmit key decisions and information), Environmental Health and Safety (EHS)/Risk Management, Center for Laboratory Animal Medicine and Care, Financial, Human Resources / Payroll, Medical Billing, Registrar's Office, and Auxiliary Enterprises (housing for students, childcare, etc.).

Another best practice included maintaining numerous hard copy forms, which could be used if IT systems were off line. Examples of important forms included purchasing documents, petty cash forms, wire transfer forms, new hire forms, time sheets, and termination papers. Additionally, in reviewing the associated website, social media platforms, such as Twitter, are used for communicating the status of emergencies with staff and the public.

In the critical manufacturing sector, given the dependence on the supply chain for many specialty materials, continuity of operations can be compromised by suppliers. For water systems, this may include specific water treatment chemicals. In addition to having the purchasing organization, or the water system, take responsibility, the supplier also has to take responsibility. The supplier should conduct a risk assessment for their critical products and present it to the buyer along with a risk mitigation strategy to ensure adherence to critical delivery times as part of a business continuity plan.

Under direction of the Department of Homeland Security, the Federal Emergency Management Agency's National Security Program is designated leader of the Federal government effort to "ensure continuity of national operations and enduring Constitutional government in response to all-hazard emergencies. This is achieved through the development of Continuity of Operations and Continuity of Government abilities." (OMB, 2006) Program results and progress ratings from myriad government agencies are analyzed by the OMB and are subsequently published at www.ExpectMore.gov in addition to documentation by the OMB and audited agencies.

In the banking and finance sector, the U.S. Securities and Exchange Commission (SEC) has been promoting that all financial firms have a role in improving the overall resilience of the financial system because of their interdependent nature. Therefore, they encourage all financial firms to review their business continuity plans and incorporate three broad business continuity objectives to the fullest extent practicable. Those are:

- Rapid recovery and timely resumption of critical operations following a wide-scale disruption

- Rapid recovery and timely resumption of critical operations following the loss or inaccessibility of staff in at least one major operating location

- A high level of confidence, through ongoing use or robust testing, that critical internal and external continuity arrangements are effective and compatible.

Disaster recovery and business resumption plans have become mandatory for all federally-supervised financial institutions. Over the last decade, the financial industry has become very aggressive in the implementation of comprehensive business continuity and disaster recovery plans.

In the information technology (IT) Sector, information sharing is one of the best practices that emerged to support resiliency. Timely information sharing is a mainstay of security in general, enabling detection, deterrence and prevention. Information sharing also supports trend analysis, risk assessment and systematic warnings, mitigation of incidents and coordination of response activities. Information sharing also leads to building trusted partnerships essential to mitigation and mutual aid, which are key concepts for resilient organizations.

According to the U.S. Government Accountability Office (GAO) website that provides information on Insurance Sector Preparedness, most of the larger insurance companies use proven best practices to protect their operations from disruption and recover critical operations.  For insurers, these actions typically include establishing geographically dispersed back-up sites and conducting critical operations at multiple geographically dispersed facilities.  Among property/casualty and life insurers, the highest priority would be to recover investment and cash management functions, while among health insurers it would be customer service and claims processing.

## Application of Best Practices to the Water Sector

In the application of best practices to the water sector, it is critical to recognize the broad spectrum of needs, ranging from a small, rural water system to the complex urban system where discontinuance of operations has potentially catastrophic impact.

A risk assessment sets the stage for business impact analysis and subsequent BCP development through the identification, prioritization, and mitigation of incidents that could impact operations. Thus, it is critical that water systems identify those potential downtime scenarios, which could include natural incidents, technological incidents, or human-related incidents.

It is also important to assess what constitutes critical downtime to a water system.  Considering the financial industry as an example, a downtime of a minute can have serious consequences.  It is important that a water system identify the maximum amount of downtime that they can tolerate while still conducting business as usual ("ride it out").  Critical downtime is also the trigger point for when the BCP is activated.

With the recovery time objectives identified, it is critical to accurately identify MEF.  Performing this activity is a delicate balance.  If there are too many MEF, there may not be the resources to address them, and if there are too few, critical functions may not be conducted.

## Results/Conclusions

While most water utilities have emergency response plans and have taken part in other preparedness efforts, there are not many with BCPs.  The financial decisions and information available are all in relation to infrastructure costs.  Less information and focus is available on the loss of revenue because of business continuity issues.  Additionally, few water utilities are satisfied with the preparedness training they have conducted, which is an important step in the planning and preparedness process. Without training and exercises, the effectiveness of emergency plans is significantly diminished.

Specific opportunities within water systems have been identified, such as increased awareness through the application of the RAMCAP<sup>SM</sup> methodology, as well as establishment of a business impact analysis system. A method for evaluating the availability of resources such as staff, facilities, vendors, community partners, and vital records and data is necessary. Additionally, few water utilities are satisfied with the level of preparedness training they have conducted, which is an important step in the planning and preparedness process.

## Applications/Recommendations

The development of BCP guidance material needs to keep in mind the existing culture of the water sector, and encourage training to integrate BCP into that culture. A business continuity model should take advantage of tools in place, such as the RAMCAP<sup>SM</sup> methodology, Water / Wastewater Agency Response Networks (WARN), the Incident Command System (ICS), and the National Incident Management System (NIMS).

### Utility Input

In two workshops with participating utilities, the project team brainstormed questions and challenges in the development of this Guidance Document and the Template, to provide materials that work most effectively for water utilities of all sizes. Ideas and issues were presented to the participating utilities at the workshops to determine the appropriateness of the guidance being developed.

### Guidance Development

The guidance takes into account the lack of time and funds on the part of the utilities for the development and training of staff to use BCPs. When possible, checklists, templates, and suggestions have been provided. Clarification of BCP terminology used has been provided, such as in regard to "Essential" functions and personnel.

### Training Efforts

The effectiveness of a BCP is increased with training. A later phase of this project includes initial training in the water sector. The water sector has expressed the desire for further education on BCP development. How to develop and implement a BCP and use of the Template will be included in the training materials.

**APPENDIX D.    BUSINESS CONTINUITY PLANNING COMMITTEE MEMBERS**

| Name | Title |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |

BCP
Template
Appendix A

**APPENDIX E.        EMPLOYEE PREPAREDNESS**

BCP
Template
Appendix B

Water utility managers all know that emergencies/disasters can and do hit, affecting employees and their homes and families.  More than 2 million families in the United States experience some sort of disaster or major emergency every year[8].  These incidences range from major events that simultaneously affect thousands of people, like the terrorist attacks of September 11, 2001, or Hurricane Katrina in 2005, to individual catastrophes like a serious home fire.  Yet, less than half the families in America have taken steps to prepare themselves for such misfortunes.

Every employee should be encouraged to be personally prepared at home.  Not only will they be better prepared to take care of their family and ensure their family's well-being, but the better prepared an employee and his/her family is at home, the more quickly they will be in a frame of mind to come to work to assist in recovery efforts.

The remainder of this section is organized into:

- Building an Emergency Supply Kit
- Developing a Family Emergency Plan
- Other Employee Support

Building an Emergency Supply Kit

Instructions for assembling a basic emergency supply kit are provided at www.ready.gov.  As these guidelines are occasionally updated, it is recommended to direct employees to this website or other preparedness websites, such as www.redcross.org, for the most beneficial up-to-date emergency kit information.

Sometimes the time, effort, and cost of building an adequate emergency supply kit is prohibitive for some employees.  If this is the case, the utility should ask them to make a goal to purchase just a few items every month.  If one can remain disciplined, a complete kit can be created within a year.

There are many resources available to assist employees with obtaining the items to build an emergency supply kit.  The utility should conduct an internet search for vendors in the area with ready-made kits to offer employees, or encourage employees to buy items individually and create their own personalized kit.  If there are community programs to assist in the development of a supply kit, employees should be directed to those programs.  Some utilities offer a group purchase plan on pre-assembled kits, as well.

Developing a Family Emergency Plan

A family emergency plan establishes the procedures and resources necessary to be prepared for a disaster or emergency, including:

- Communications Plans
- Evacuation / Relocation Plans

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[8] Disaster Ready People for a Disaster Ready America, J. Satterfield 2008. Firestorm Solutions, LLC.

75

- Building an Emergency Supply Kit

There are several comprehensive family emergency plan templates available via the web.  Some of the most comprehensive templates include:

- www.prepareusa.com
- www.ready.gov

Besides completing an Emergency Plan Template, some additional items for employees to consider are:

- Subscribe to the community alert notification system; systems are now available that send instant messages or emails automatically when an incident happens that could impact a particular population
- Choose an out-of-state emergency contact and be sure each family member knows the contact information
- Long distance service on land lines may work better than local service or cell towers; text messaging may also be a good communication option
- The contact list within an Emergency Plan is the phone book for communicating to authorities, work, friends and family

## Other Employee Support

After an incident, employees may not be able to focus on their work because of other obligations in the recovery efforts in their personal lives.  At this time, it may be beneficial to the operations of the utility to offer assistance to employees such as:

- Advice and guidance for insurance claims
- Counseling services
- Special check-cashing services
- Ability for employees to purchase family emergency supplies through the water utility, perhaps through payroll deduction

While many utilities are uncomfortable directly supplying these services, having an outside authority come on-site for employee convenience may allow workers to focus on the recovery and continuity of the operation.

**APPENDIX F.        PLAN MAINTENANCE**

BCP
Template
Appendix C

### Annual Evaluation

A viable plan is an updated plan.    Plan maintenance, which encompasses keeping contact lists current as well as keeping the strategies, timeframes and resources up to date, is key to having a plan that will work for you during your next crisis.

### Identifying Necessary Changes

As the concept of business continuity is accepted within the company culture, it becomes easier and easier to identify changes in the daily operating procedures or resources that will impact the BCP operations.  This mindfulness should be incorporated in BCP updates.

New computer systems, priorities, timeframes, resources, management and interdependencies can all impact the viability of the BCP.  These changes in business practice should be noted throughout the year so that they are not forgotten when the scheduled plan maintenance window has arrived.  When it is time to update the plan an inventory of the systems, personnel, procedures and promises to customers should be assessed.  Keeping track of the changes as they occur can simplify the inventory process.

### Responsible Party

Each employee is responsible for the recovery of daily responsibilities.  As every employee becomes aware of the continuity plan they should be sure it protects the MEF that are executed each day.  Alternatively, the direct responsibility should fall on management and the continuity planning team that has been created.  The BCP Development Team should be mindful about the changes that occur within the utility and how those will impact the BCP.

### Quarterly Update of Contacts

It is recommended that personnel and contact information is maintained quarterly at a minimum.  It is very advantageous to maintain names and phone numbers as changes occur, as contacting people is one of the biggest challenges following an incident, especially one with regional impacts.  The rest of the plan, in its entirety, should be reviewed and updated annually at a minimum.

Remember, keeping your plan updated is KEY to having a functional continuity plan that will assist you through a disruption.  Make every effort to not let your hard work of creating the plan be wasted.  Adopt a maintenance calendar and follow it.

Helpful Hint:  Including Business Continuity Plan maintenance as part of the job responsibilities and/or part of the annual review process is very helpful.

And, it is important that the changes made are consistent with all related plans.

**APPENDIX G.**      **BUSINESS CONTINUITY PROGRAM CASE STUDY**

Prepared by:

EAST BAY MUNICIPAL UTILITY DISTRICT

Regulatory Compliance Office

June 2011

## Introduction

East Bay Municipal Utility District's (EBMUD) Strategic Plan contains a goal to maintain an active Emergency Preparedness Program to plan for and manage the District's functions during an emergency and allow for an efficient and effective recovery following an emergency.  This goal is in support of the District's Policy 7.03 which states that the District will create and maintain an active Emergency Preparedness Program that includes an Emergency Operations Plan (EOP) written and administered to help manage the District's critical functions during any emergency and protect people, property, and the environment. The District coordinates the EOP function and response with Federal, State, and local agencies and private entities charged with emergency duties. The District has created and maintains a Business Continuity Program Plan to minimize impacts to critical business functions and enhance its capability to recover operations expediently and successfully following a disruptive incident.  As such, the District requires updates to the EOP and Business Continuity Plans (BCPs) every 2 years and annual exercises for each program and plan.

For the District, the Emergency Management and Business Continuity (BC) Programs are distinct from each other, but are complementary especially during the preparedness, response and recovery phases. Emergency management focuses on managing an incident that threatens life, property, or the environment, whereas business continuity is focused more on the continuity and recovery of the business functions critical to the organization's survival (e.g., revenue collection, accounts payable, payroll, procurement, etc.).  Many of these mission-critical functions support emergency operations.

## Background

The District provides water to approximately 60 percent of the developed area within two counties in the San Francisco Bay Area or 1.35 million users over 331-square mile service area.  The Wastewater system intercepts and treats wastewater for 650,000 customers in an 88-square mile area along the Bay's east shore.  EBMUD employed approximated approximately 1,700 employees at the end of FY11 (i.e., June 2011).

The District has 470 facility assets which includes 448 water and 26 wastewater facilities (e.g., buildings, water treatment plants, water storage facilities, pump stations, water reclamation facilities, and service yards).  Of these facilities, 56 are employee occupied sites.  The District manages approximately 4,000 miles of pipeline, 75,000 distribution valves, 30,000 hydrants, 370,000 service tap meters.

EBMUD has 300 servers, 150 terabytes of data, and over 180 applications.  Thirty-three business functions are identified as critical with associated applications and systems.  The BC Program's goals are to prioritize and document all critical business functions; and map resources, processes, IT dependencies, networks, and relationships.  The BC Program is tasked with the responsibility of ensuring that the District is prepared to recover from any disruption, from small power outages to wide-spread natural disasters.

District Policy 7.03, Emergency Preparedness/Business Continuity, establishes the authority to create and maintain a business continuity program to minimize disruptions of critical business functions and to

enhance its capability to recover operations expediently and successfully following an incident that causes interruption in business.  Policy 7.03 also supports an active Emergency Preparedness Program that includes an Emergency Operations Plan (EOP) written and administered to help manage the District's critical functions during any emergency and to protect people, property, and the environment.  The purpose of the District-wide Business Program Plan (BC Program Plan or BCPP) is to establish a written program and organizational structure to guide development of individual Business Continuity Plans (BCPs) in accordance with Policy 7.03.  Each BCP addresses one business organization or a group of business organizations.

The District BCPs were first established in 2001.  The District updated them in 2005 and 2006 in response to lessons learned from Hurricane Katrina.  In 2005, under the District's internal Management Leadership Academy (MLA) Program, a scope of work for a Business Continuity Program Project was developed.  The purpose of the project was to review and evaluate the District's BCPs for completeness, effectiveness, and make recommendations for implementation.

Based on the recommendations from the project, the District established the Manager of Business Continuity position in the Operations and Maintenance Department in 2008.  The Manager of Business Continuity plans, manages, and coordinates the development, implementation, and maintenance of the District-wide Business BCPP; provides guidance and consultation to managers and staff in the development and update of department specific and function specific BCP's; coordinates analyses to determine relative vulnerabilities of business functions and mitigation and response strategies to restore service levels and adequacy of BCPs.

The District continues to make great strides in its Preparedness Program plans.  A complete revision of the EOP was published in FY10 and additional information and guidance has been added in FY11 to support key functions in emergencies.  In FY11, the BCPP was updated based on new guidance from AWWA and to ensure integration with the EOP.  Several other supporting documents were also updated based on exercises, incidents, or feedback from stakeholders

## Program Overview

The District's BC Program is organized in three levels: Business Continuity Program Management (BCPM), BC Team, and BC Team Support staff.  The BCPM consists of the Manager of BC and Senior Management Team working together in the strategic vision and implementation of the BC Program.  The BCPM sets performance measures and provides general guidance on the BC Program and coordinates with the Emergency Operations Team (EOT).  The Manager of BC oversees the District's recovery as a part of the EOT BC Officer.  The Senior Management Team coordinates Department recovery in a major emergency through the General Manager.

The BC Team consists of BCP Coordinators with Department Directors.  The BCP Coordinators work with their Department Directors on the development, exercise, and training for their BCPs.  The District has 23 individual BCPs.   BC Team Support is a subcomponent of the BC Team includes the BCP Representatives.  These BCP Representatives support the BCP Coordinators in drafting the BCPs and are subject matter experts for the Section or Division they represent

The District's BCPP is written and administered in accordance with the guidelines of the National Fire Protection Association (NFPA), Department of Homeland Security (DHS), Federal Emergency Management Agency's (FEMA), and Disaster Recovery Institute International (DRII) guidance. The BCPP and associated BCPs are designed to be sufficiently flexible for application in all types of incidents and any level of emergency (i.e., all-hazards approach).

## Lessons Learned

The implementation of a BC Program in a sustainable fashion requires a program leader be designated and given appropriate authority. This person should possess good leadership qualities and communication skills, a good understanding of the business culture, processes and operations, knowledge of information technology, and strong project management capabilities. Each member of the BC Team should have key performance indicators as part of their performance plan. The Program Manager should provide regular status reports to the senior management team. Management support and buy in is essential to the success of the program.

Training, Testing and Exercises – Training is a key component of an effective program. Staff needs to have a clear understanding of expectations, roles, and responsibilities. A testing and exercise plan must be established to ensure useful and realistic expectations. The testing and exercise plan will increase general awareness, reveal gaps and omissions, improve coordination, and clarify roles and responsibilities. For the District, since each unit develops their own plan, it is important to bring together these plans to validate assumptions and review them comprehensively. Metrics, tracking, and performance reporting should be part of the routine status information provided to management.

Policies and Procedures – Policies and procedures document and codify expectations for the BC Program. The policies set priorities, drive the process and determine the best viable solutions for recovery.

## Key Findings

For the District, the following issues were identified for ongoing review and assessment.

Facilities and Systems – There are 12 critical facilities located in the Hayward earthquake fault zone that may be significantly damaged in an earthquake. These facilities are rated for life safety, but may not be operational following a major earthquake. Alternative work locations, teleworking and other mitigation measures must be evaluated and implemented to ensure sustainable operations for critical business functions.

Revenue – The District handles approximately $10 million a month in accounts payable, $16 million a month in payroll, and $1-3 million a day in payments from the customers. Based on the dependency for internet and data connectivity for transactions and processing with the seismic vulnerability for our service area, the District may be heavily dependent on the reserves to sustain operations in a major regional disaster. Creating and testing mitigation plans is part of the strategy for recovery for these business functions.

Information Systems – Information (hardware and software) and communications (telephone, radio, email, etc.) systems are essential to the District's ability to conduct business. Disaster recovery procedures are vital to District operations and critical business functions. The District's disaster recovery program is evolving and part of these efforts is looking for opportunities to partner with other agencies.

Critical Business Functions – Accounting, call center, payroll, human resources, purchasing, and treasury are critical business functions to support emergency operations. Having mitigation measures, procedures, and alternative work locations are critical to timely recovery and resiliency for the District.

**APPENDIX H.        TESTS, TRAINING, AND EXERCISES**

A critical component of any preparedness planning process is tests, training, and exercises (TTE).  The primary goal of a TTE and evaluation program for the business continuity program is to confirm that employees know what to do to in an emergency to maintain and protect the public health of the community with a continuous, stable supply of clean drinking water. To this end, it is a best practice to include these plans within the framework of the business continuity plan (BCP).  The purpose is to inform knowledgeable staff that the information and resources they require is in place to implement the BCP.  Orientation, training, tests, table-top exercises, and operational exercises are ways to introduce continuity concepts and assure familiarity and even expertise with implementation of the BCP.  The BCP should include a schedule for TTE.  The annual schedule is used to budget for employee time, training area, and facilitation, if necessary, and significantly contributes to continuous improvement.

**Training**

BCP employee training starts the day employees are hired and should include:

- A BCP overview as part of their new employee orientation training
- Periodic refresher training on the requirements of the BCP including alternate operating locations, equipment and procedures, maximum allowed downtimes, emergency procedures, notification, personal preparation, and reporting procedures
- Additional training when the plan is changed
- Training rosters that include all key personnel and are updated when key staff leave or join the utility
- Appropriate level and frequency of training for employees with specialized, key or complex roles in the BCP or in its planning process (e.g., planners, IT personnel, successors and those with delegated authorities in the BCP)
- Adequate documentation of the BCP training as well as any certifications required to operate the water system in compliance with regulatory standards
- Training (and certifications/authorities) necessary to successfully perform any secondary MEF related tasks or positions assigned to employees, managers and executives (this is called the TPR or trained personnel requirement)
- Experiential training such as exercises or cross-training into the MEF assignment to promote employee and community confidence in the BCP
- The use of training programs offered by DHS, EPA, FEMA, CERT, EPA, the local EMA or UASI; many of these are on-line and available without duty-time restrictions; at a minimum, this should include NIMS and ICS courses designed for employees of water systems and public works and education concerning the greatest potential threats to the particular system
- Participation in training offered by those agencies listed as partners in Mutual Aid/Assistance and coordinated programs offered by the county EMA or UASI authorities.

- Participation by local officials and elected representatives in available training pertinent to continuity within the water system critical infrastructure; utility executives should receive orientation to their roles as leaders during the recovery
- In general, training programs should be defined to fit the specific BCP and should be interesting and rewarding. Employees do not have to receive training on the entire plan in one session. Some training is best done in the workplace while on the job.

**Testing the BCP**

The focus and schedule for BCP exercises is on the BCP and MEF tasks, preferably using the alternate location, equipment, and systems. This is crucial because personnel may be assigned MEF responsibilities that are not routine. The BCP should be tested for viability and to advance continuous improvement. Various forms of testing occur with regularity within a water system and when applicable these should be documented as they apply to the BCP. Equipment should be tested on a regular basis using the technical manual and new equipment should be tested when it is installed. The spare parts inventory should be inspected periodically to determine status. All communication equipment and systems and IT systems intended for use at alternate facilities should be tested periodically. IT system tests for the BCP should focus on availability. New and alternate facilities should be tested to determine if resources are available, operational, and employees can access them properly.

Key components of the BCP should be tested, at least annually but preferably two or three times a year. A test of the notification system is not very expensive, but it is critical that rosters, telephone numbers, keys, passwords, etc. are current and accurate. The procedures should be tested for transporting vital documents, portable PCs, protective clothing, and lab equipment, and then using them at the alternate location. Employee skills should be tested regarding manual alternatives including intrusion detection, contamination detection, notifications such as return to duty and boil/do not use water announcements, locating and turning valves, and reading meters. Alternate facilities should be tested to determine accessibility, power, communications systems, water, restrooms, rest areas if needed, air conditioning or filtration, cleaning supplies, first aid kits, and vehicle support if needed. The most formidable alternate facility in the world may be useless to the BCP if employees cannot find it, don't have keys when they get there, and then cannot refuel vehicles nearby or the power was turned off six months ago.

Another form of test is annual review by someone outside the water utility such as the county EMA director, a representative of the regional WARN, or an appropriate representative of a professional association. Still another form of test is an audit of the BCP by a higher authority, designated official, or financial agent. Pen and paper tests or examinations might be done before/after training sessions to reinforce the material in the session. Examinations for promotion or competition for recognition or incentives are a good way to test employee skills with components of the plan. While neither the ANSI/AWWA J-100 Standard nor any regulatory agency currently requires plan certification, this too is a possible test of the plan. Plan certification is offered by few commercial consulting firms using BS25999, the British standard for Business Continuity Management.

**Guidance on Developing and Conducting Exercises - HSEEP**

**Developing BCP Exercises**

For water utilities, tabletop exercises and games are the most popular among the seven HSEEP exercise levels.  Drinking water scenarios are difficult to conduct in operational modes as individual treatment plants are not routinely taken off-line for training purposes, whereas other critical infrastructure facilities may be able to be taken off-line for the duration of an exercise. Distribution and collection systems are built throughout the agency jurisdiction and may overlap urban or rural governance district jurisdictions, response zones or neighborhoods. This makes performing large-scale operational exercises difficult due to the number of agencies that would likely be impacted.

The following is a description or guide for a "game" in HSEEP terminology.  This is sometimes called an "enhanced tabletop exercise" in EPA toolkits.  Models or templates are available in the HSEEP document library or the EPA exercise toolkit.

Guidance on Developing and Conducting Exercises - HSEEP

While there is no specific regulatory requirement to use it, the Homeland Security Exercise and Evaluation Program (HSEEP) offers a wealth of guidance and a document library of tools and scenarios to use in developing the utility BCP exercises (**www.hseep.gov**).  The Environmental Protection Agency (EPA) water security toolkit (http://water.epa.gov/infrastructure/watersecurity/) also offers an array of exercise guides, models, and templates that can be adjusted for use in achieving relevant BCP training goals.  If possible, using the library available will save the utility considerable expense in hiring suitable training consultants to prepare and facilitate this kind of training and/or evaluation.  The websites LLIS.gov, HSDL.gov, and HSEEP.gov all carry searchable templates, exercise scenarios, and lessons learned reports from local, state, and national exercises.  In June 2010, EPA published the Tabletop Exercise Tool for Water Systems: Emergency Preparedness, Response, and Climate Resiliency (TTX Tool). The TTX Tool is designed to assist those interested in planning and facilitating tabletop exercises on Water Sector-related issues.  The TTX Tool expands on the capabilities of the ERP tool, published in 2005.  (O'Grady, 2011)

Within the HSEEP, there are seven levels of exercise with graduated skill level and intensity.  These are:

1. Seminar

2. Workshop

3. Tabletop exercise

4. Games

5. Drill

6. Functional exercise

7. Full-scale exercise

Of these, the first four levels are called "discussion-based" requiring a facilitator, employee training time, and a suitable training area.  Some utilities have achieved training goals by offering these in brown

87

bag lunch forums, internal team competitions, and as performance incentives. The others involve operational commitment including in depth planning, personnel, equipment, and budget. All levels are scalable to the size and needs of the water utility. Small utilities may join others in their WARN or first responder agencies within their UASI or jurisdictional EMA to participate fully and gain the most benefit from full-scale exercises. FEMA conducts national level exercises and invites at least online or observer participation well in advance.

The following definitions have been extracted from the Water/Wastewater Agency Response Network (WARN) Tabletop Exercise Facilitator's Guide (Whitler, 2008) and correspond with the definitions found in the HSEEP.

**Seminars**

Seminars are informal discussions, unconstrained by real-time portrayal or enactment of incidents. Led by a presenter, seminars are generally employed to orient participants to, or provide an overview of, authorities, strategies, plans, policies, procedures, protocols, response resources, and/or concepts and ideas. Seminars provide a good starting point for entities that are developing or making major changes to their plans and procedures.

**Workshops**

Workshops represent the second tier of exercises in the HSEEP building-block approach. They differ from seminars in two important respects: there is more participant interaction, and the focus is on achieving or building a product (such as a draft plan or policy). Organizations often use workshops in conjunction with exercise development to determine objectives, develop scenarios, and define evaluation criteria. A workshop may also be used to produce new standard operating procedures (SOPs), emergency operations plans (EOPs), Mutual Aid and Assistance Agreements (MAAs), multi-year plans, or improvement plans. To be effective, workshops must focus on a specific issue, and have clearly defined desired outcomes or goals.

**Tabletop Exercises**

Tabletop Exercises bring together key personnel to discuss hypothetical scenarios in an informal setting.

WARN Members can use this type of exercise to assess plans, policies, and procedures, or to evaluate the systems needed to guide the prevention of, response to, and recovery from a defined incident. Tabletops are typically aimed at facilitating understanding of concepts, identifying strengths and shortcomings, and achieving changes in the approach to a particular situation. An exercise facilitator encourages participants to discuss issues in depth and develop decisions through slow-paced problem solving, rather than the rapid, spontaneous decision-making that occurs under actual or simulated emergency conditions. The effectiveness of a tabletop is derived from the energetic involvement of participants and their consideration of recommended revisions to current policies, procedures, and plans. A WARN may participate in independent, state, or local tabletop exercises. The TTX Tool developed by EPA can be used to develop and facilitate tabletop exercises that meet this HSEEP definition.

**Games**

A game is a simulation of operations that often involves two or more teams and uses rules, data, and procedures to depict an actual or hypothetical situation. The goal of a game is to explore decision-making processes and the consequences of those decisions. A game does not require use of actual resources. The sequence of incidents affects, and is in turn affected by, decisions made by players. With the evolving complexity and sophistication of current simulations, opportunities to inject greater realism have increased. Computer-generated scenarios and simulations can provide a method of introducing highly realistic situations and making conditions change on the fly. Planner decisions can be input into realistic models to show the effects of decisions made during a game. An additional benefit of Internet-based, multi-player games is that they depict a collaborative environment that reflects realistic occurrences. Popular in today's market, software simulations can be purchased or created to enhance these activities.

Operations-based exercises represent the next level of the exercise cycle. They are used to validate the plans, policies, agreements, and procedures solidified in discussion-based exercises. Operations-based exercises include drills, functional exercises (FEs), and full-scale exercises (FSEs).

**Drills**

A drill is a coordinated, supervised activity used to validate a single, specific operation or function in a single agency or organizational entity. Drills are commonly used to provide training on new equipment, develop or validate new policies or procedures, or practice and maintain current skills. Typical attributes of drills include:

  Narrow focus, measured against established standards
  Generation of immediate feedback
  Realistic environment
  Test of unit performance in isolation

**Functional Exercises**

A Functional Exercise is designed to evaluate and validate individual capabilities, multiple functions, activities within a function, or interdependent groups of functions. Functional exercises focus on an exercise scenario with dynamic incidents that drive activity at the management level. A functional exercise simulates everyday operations in a functional area by presenting complex and realistic problems that require rapid and effective responses by trained personnel operating in a highly stressful, time-constrained environment. A WARN may participate in independent, state, or local functional exercises.

**Full-Scale Exercises**

Full-Scale Exercises are multi-agency, multi-jurisdictional, multi-organizational exercises that validate many facets of preparedness. They include many players operating under cooperative systems, such as an Incident Command System (ICS), to effectively and efficiently prevent, respond to, or initiate recovery from an incident. Full-scale exercises focus on implementing and analyzing the plans, policies,

procedures, and cooperative agreements developed in discussion-based exercises and honed in previous, smaller, operations-based exercises. In full-scale exercises, a highly realistic depiction of operations in multiple functional areas presents complex and realistic problems that require critical thinking, rapid problem solving, and effective responses by trained personnel. During full-scale exercises, facilitators insert hypothetical incidents through a scripted exercise scenario with built-in flexibility to allow updates that drive activity. The exercises play out in real time, creating a stressful, time-constrained environment that closely mirrors real-life events.

90

## APPENDIX I.    REFERENCES AND REGULATIONS

ANSI/AWWA G440-11, AWWA Standard for Emergency Preparedness Practices

Code of Federal Regulations

Control Systems Security Recommendations for Standards Developers, DHS, 2010

Department of Health and Human Services Administrative Data Standards and Related Requirements: Security Standards for the Protection of Electronic Protected Health Information

EPA 817-K-06-001, Active and effective water security programs, National Drinking Water Advisory Council Recommendations on Water Security, 2006

Federal Emergency Management Agency (FEMA)

FEMA Lessons Learned Information Sharing

Federal Preparedness Circular (FPC)-66

Continuity Plan Template

GSA Order ADM P 1025.2C, Information security

GSA Order PMS P 5930.1, Internal physical security

HIPAA 164.316

J-100-10 RAMCAP<sup>SM</sup> Standard

National Fire Protection Association (NFPA) 1600 Standard on Disaster/Emergency Management and Business Continuity

National Incident Management System (NIMS)

NRF Resource Center

National Response Framework (NRF), Jan 2008

NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems

NIST Special Publication 800-53, Rev 3Recommended Security Controls for Federal Information Systems and Organizations, 2009

NIST Special Publication 800-34 Rev. 1, Contingency Planning Guide for Federal Information Systems, 2010

ISO 17799/27002 - Code of Practice for Information Security Management

ISO-27002:2005 5.1.2

OMB 2006. http://www.whitehouse.gov/omb/expectmore/summary/10003622.2006.html    extracted from website April 2011.

Security Information Collaboratives: A Guide for Water Utilities

Water Sector Coordinating Council Strategic Roadmap

[Water and Wastewater Agency Response Network(WARN)](#)

**APPENDIX J.          GLOSSARY OF NOTABLE TYPES OF PREPAREDNESS PLANS**

**Business Continuity Plan (BCP)** – A plan that pulls together other preparedness plans in an organization and addresses how the organization will stay in business following an emergency or disaster incident.

**Continuity of Government Plan (COG)** – A plan that addresses how a governmental agency will sustain its governance functions following and incident.

**Continuity of Operations Plan (COOP)** – A plan that addresses how an organization will stay in operations during and following an incident.  COOPs are more commonly used in the public sector, while BCPs are more commonly used in the private sector.  Some COOPs address all of the components of a BCP, but most do not.

**Crisis Communications Plan (CCP)** – A plan that provides plans, protocols, and prepared messages for communicating with stakeholders, the public, and the media during and after an incident.

**Disaster Response Plan (DRP)** – A plan that addresses response and recovery for the Information Technology (IT) component of an organization.  (While the name does not indicate, Disaster Response Plans apply almost exclusively to the IT sector.)

**Emergency Operations Plan (EOP)** – A plan that spells out the emergency operations protocols in an organization or jurisdiction.  This terminology is often used by county and state emergency management agencies.

**Emergency Response Plan (ERP)** – A plan that addresses how an organization will respond to an incident.  All water utilities serving 3,300 customers or more were required by the Bioterrorism Act to develop ERPs.

**Pandemic Plan** – A plan for how an organization will remain in operations if a substantial portion of its workforce is unavailable due to a pandemic.  Pandemic Plans are sometimes also referred to as "Pan Flu Plans" or "Labor Shortage Plans", which address labor shortages due to causes other than pandemic.

**Risk Management Plan (RMP)** – A plan that examines the risks to which an organization may be subjected and identifies the means by which the risks will be mitigated or addressed.

### APPENDIX K.  SAMPLE MEF QUESTIONNAIRE

To reach our preparedness goals, please use this worksheet to collect the information necessary for the creation of your Department's COOP or COG.

**What are Mission Essential Functions (MEFs)?**

A MEF is any task or process that your Department is either obligated (by County policy, contractually, or by regulation) to perform, or action, which—if your Department ceased to perform—would significantly disrupt or cause extreme expense/burden to your Department, Wake County, or our citizens.

**General Information Requirements**

This questionnaire is intended to gather information about the system's essential functions and services. On the following page, department-specific questions are provided to glean as much information as possible regarding department-related preparedness.

**Responsibility**

This questionnaire is expected to be completed by [Managers, Department Managers, Team leaders] or their designees, working closely with [Managers, Department Managers, Team leaders].

**General Guidance**

*Increasing the number of rows in a table*

Throughout this questionnaire, to add rows for more information, simply click on the right-most cell at the bottom of the table and hit the "Tab" button on your keyboard.

**What information do I need for my Department-specific MEF?**

1. Roster—please indicate which employees report to you and their contact information (please include an alternate phone number—whether a company-issued phone or home phone number). Include whether your direct reports are considered "continuity personnel".  Continuity personnel are individuals who perform, or will be called on to perform, duties that are critical to the continuity of your department's MEFs.

2. Mission Essential Functions (MEFs)—list essential functions or tasks that your department performs.

3. Dependencies/Interdependencies—which function(s) of another department does your department rely upon to complete your MEFs (*dependencies*)? Does any other department rely upon your department to complete their MEFs (*interdependencies*)?

4. Vital Records—what records are vital to your department's MEFs? How (paper, electronic, etc.) and where are those records stored and what back-up information storage is in place?

95

5. Vital Equipment—what equipment is vital to your department's MEFs? What equipment does your department need to perform its MEFs?

6. Business Impact Analysis/Risk Assessment—this evaluation process identifies risk and assesses the impact of certain risks on the MEFs.

7. Order of Succession— an order of succession is a list of individuals who would sequentially assume responsibility if the principal staff person is no longer able to carry out his/her functions. (Delegation of authority refers to positions in which the principal staff person has the authority to complete a particular task.)

8. Delegations of Authority—Authority is delegated to a position title, not to an individual. Delegations of authority "flow down" through the chain of command. It is not necessary to issue a delegation for routine office management and/or administrative responsibilities. If a written delegation does not contain a statement disallowing or limiting redelegation, the presumption is that the authority may be redelegated.

9. Plans Already in Existence—please identify any Contingency Plans already in existence for your Department.

**PLEASE USE THE WORKSHEET ON THE FOLLOWING PAGES TO COLLECT THE**


**NECESSARY INFORMATION FROM YOUR DEPARTMENT**

# Department-Specific MEF

# Information Collection Worksheet

Please provide the name of your department, its leadership, and the designated Department Continuity Coordinator (the person/position responsible for plan development and maintenance for your department).

| MEF Ownership | |
|---|---|
| **Department:** | |
| **Department Leader:** | |
| **Department Continuity Coordinator:** | |

Please provide a roster of all employees in your department. For large departments, this can be provided in a separate document that provides the requested information. The term "continuity personnel" is intended to capture positions that are required to perform mission essential functions immediately or within the first 30 days.

| Roster – Will be a plan annex or attachment | | | | |
|---|---|---|---|---|
| **Employee Name** | **Title** | **Primary Phone #** | **Secondary Phone #** | **Continuity Personnel?** |
| | | | | ___Yes ___ No |
| | | | | ___ Yes ___ No |
| | | | | ___ Yes ___ No |
| | | | | ___Yes ___ No |
| | | | | ___Yes ___ No |
| | | | | ___ Yes ___ No |
| | | | | ___Yes ___ No |
| | | | | ___Yes ___ No |
| | | | | ___Yes ___ No |

Please provide your department's mission essential functions. To do this, analyze the mission of your department and then identify which functions must be completed to perform the mission.  Think in terms of functions that must be provided within a 30-day timeframe.

| Mission Essential Functions | |
|---|---|
| MEF | Priority |
| | |
| | |
| | |
| | |
| | |

Please provide your department's dependencies, which are functions that other departments or entities perform that your department requires to fulfill your MEFs (e.g., payroll, fuel supplies, etc). Interdependencies are functions that your department provides for other departments that fulfill their MEFs.

| Dependencies/Interdependencies |
|---|
| What are your Department's critical dependencies? |
| |
| |
| |
| |
| |
| What are your Department's critical interdependencies? |
| |
| |
| |
| |
| |

Identifying vital records and equipment needed to perform your department's MEFs is crucial for reconstituting operations following a large-scale disruption.  Ensure that specialty equipment is identified.  Also, please identify the priority of the records and equipment using a 1-3 scale, with "1" being the highest priority.

| Vital Records | | | |
|---|---|---|---|
| **Vital Record** | **Form (paper, electronic, etc.):** | **How Currently Backed-up?:** | **Priority:** |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| Vital Equipment | | | |
|---|---|---|---|
| **Vital Equipment** | **Additional Details:** | **Quantity:** | **Priority:** |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Using the MEFs previously identified, examine what types of "potential disruptions" could impede the delivery of your MEFs. When examining disruptions, focus on the actual disruption rather than what causes it (for instance, a hurricane or pandemic influenza both prevent employees from reporting to work, which causes payroll to go unprocessed. The disruption in this case is not the hurricane or the flu, but unprocessed payroll due to high employee absenteeism). Rate the loss effect as low, moderate, or high depending on how severely the disruption affects the MEF. Rate the vulnerability (or susceptibility) of the disruption as low, moderate, or high. Vulnerability is analyzed based on the frequency of the occurrence versus the preparation for the disruption. Finally, please assess overall risk by analyzing the loss effect versus the vulnerability of the MEF to a "possible disruption".

| Business Impact Analysis/Risk Assessment | | | | |
|---|---|---|---|---|
| MEFs: | Possible Disruptions: | Loss Effect:<br><br>*(Low, Moderate, or High)* | Vulnerability:<br><br>*(Low, Moderate, or High)* | Overall Risk Evaluation:<br><br>*(Low, Moderate, or High)* |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Each position with critical roles or responsibilities in fulfilling the department's MEFs should be assigned a primary and secondary alternate.

| Order of Succession | |
|---|---|
| **Department Leader** (*or insert title*) | |
| **Primary Alternate** *(Title)***:** | |
| **Secondary Alternate** *(Title)***:** | |
| | |
| *Insert Title* | |
| **Primary Alternate** | |
| **Secondary Alternate** | |
| | |
| *Insert Title* | |
| **Primary Alternate** | |
| **Secondary Alternate** | |
| | |
| *Insert Title* | |
| **Primary Alternate** | |
| **Secondary Alternate** | |

Based on the order of succession, those with authority should plan to delegate authority in the event of incapacitation or unavailability during a disruption. Authority can refer to signature authority, procurement/purchasing authority, or even authority to adjust compensation. It is important to explain the limitations of authority, if other authorities are affected by the delegation, and the positions (rather than persons) that will be delegated the authority as primary and secondary delegations.

| Delegations of Authority | | | | | |
|---|---|---|---|---|---|
| Source of Authority: | Description of Authority: | Limitations of Authority: | Authorities Affected by Delegation: | Primary Delegation: | Secondary Delegation: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Please list any existing documentation, guidance, and/or policies pertaining to security procedures, pandemic influenza, or emergency/abnormal operation conditions that your department maintains or has created in the past.

| Existing Plans/Policy/Guidance | |
|---|---|
| Plan Name: | Date: |
| | |
| | |
| | |
| | |
| | |

# ABBREVIATIONS

AAR – After Action Report

AWWA – American Water Works Association

ANSI – American National Standards Institute


BCP – Business Continuity Plan

CCP – Crisis Communication Plan

CERT – Community Emergency Response Team

COOP – Continuity of Operations Plan


DRP – Disaster Recovery Plan


EPA – Environmental Protection Agency

EOC – Emergency Operations Center

EOP – Emergency Operations Plan

ERP – Emergency Response Plan


FEMA – Federal Emergency Management Agency

FRP – Facility Response Plan


GETS - Government Emergency Telecommunications Service

GIS - Geographic Information System


ICS – Incident Command System

IT – Information Technology


MEF - Mission Essential Functions

MTD – Maximum Tolerable Downtime


NFPA – National Fire Protection Association

103

NIMS – National Incident Management System

POD – Point of Dispensing

RAMCAP<sup>SM</sup> - Risk Analysis and Management for Critical Asset Protection

RAM-W™ - Risk Assessment Methodology for Water

RMP - Risk Management Plan

ROI – Return on Investment

SCADA – Supervisory Control and Data Acquisition

SPCC – Spill Prevention, Control, and Countermeasure Plan

SPF - Single Point of Failure

TPR – Trained Personnel Requirement

VA – Vulnerability Assessment

VPN – Virtual Private Network

VSAT™ - Vulnerability Self-Assessment Tool

WARN – Water / Wastewater Agency Response Network

WHEAT – Water Health and Economic Analysis Tool

WPS - Wireless Priority Service

WSCC – Water Sector Coordinating Council