Control Number: 53385

Item Number: 1807

JACOB MARTIN

INTEGRITY
EXCELLENCE
TRUST

February 28, 2024

Public Utility Commission of Texas
1701 N. Congress Avenue
PO Box 13326
Austin, TX 78711-3326

RE: Emergency Operations Plan
Response for Emergency Operations Plan
(City of San Saba) (TX2060001)
San Saba County, Texas

#53385

Dear PUC:

Jacob Martin is submitting the Emergency Operations Plan (EOP) 2024 Annual Renewal on behalf of the City of San Saba.

We appreciate the diligent efforts the PUC has made and will make to prepare for the challenging process of reviewing thousands of EOP's. To assist your efforts, we have prepared accurate documents for your review.

If you have any questions or need additional information, please feel free to contact Sarah Fernandez at sfernandez@jacobmartin.com or at 325-695-1070.

Sincerely,

Sarah Fernandez
JACOB | MARTIN

Sarah Fernandez

1807

JACOB MARTIN

INTEGRITY
EXCELLENCE
TRUST

February 28, 2024

Public Utility Commission of Texas
1701 N. Congress Avenue
PO Box 13326
Austin, TX 78711-3326

RE: Executive Summary
Response for Emergency Operations Plan
(City of San Saba) (TX2060001)
San Saba County, Texas

Dear PUC:

Jacob Martin is submitting the Executive Summary for the Emergency Operations Plan (EOP) on behalf of the City of San Saba.

The City of San Saba's EOP contains Incident-Specific Response Procedures (ISRPs), specialized procedures tailored to an incident type. Incidents may include, but are not limited to, the following:

- Incident Command System (ICS)
- Cybersecurity & Cyber Intrusion
- Drought
- Extreme Cold and Winter Storms
- Extreme Heat
- Flooding
- Tornado
- Wildfire
- Power Outage Generators
- Pandemic

EPA's website provides a number of incident action checklists (IACs) that City of San Saba used to help develop their own ISRPs.

City of San Saba's EOP has a dedicated page for the Plan Distribution for employee recipients. This page includes a fill in section for name, title, who it was distributed by, and on what date.

Attached is an affidavit confirming this EOP signed by the City Manager, Scott Edmonson.

If you have any questions or need additional information, please feel free to contact Sarah Fernandez at sfernandez@jacobmartin.com or at 325-695-1070.

Sincerely,

Sarah Fernandez
JACOB | MARTIN

City of San Saba

March 4, 2024

Public Utility Commission of Texas
1701 N. Congress Avenue
PO Box 13326
Austin, Texas 78711-3326

Re: Emergency Operations Plan (EOP) Tabletop Meeting

To Whom It May Concern:

I, Scott Edmonson, City Manager of the City of San Saba, Texas hereby attest to the fact that the City of San Saba had changes to the City's Emergency Operations Plan (EOP) those changes are as follows:

EOP Information Updated on 02/28/2024 by:

Denver Daniel – Electric Dept. Superintendent;
Glynn Meador – Electric Dept. Lineman;
Scott Glaze – Public Works Director;
Jacob Uptain – Electric Dept. Lineman;
Kyle Anderson – Electric Dept. Lineman; and
Scott Edmonson – City Manager.

Population Information.

Utility Information.

My Contact and Resources.

Existing Generator Information Sheet.

If you need additional information or I can be of further assistance, please feel free to contact me at the number listed below.

Respectfully,

Scott Edmonson
City Manager
City of San Saba
(325) 372-5144

MUNICIPAL OWNED UTILITIES AFFIDAVIT
FOR EMERGENCY OPERATIONS PLAN

STATE OF TEXAS §
COUNTY OF SAN SABA §

Before me, the undersigned authority, on this day personally appeared

Scott Edmonson who being by me duly sworn, deposes
(name of person representing municipality)

and says that **(s)**he is the City Manager
(title of person representing municipality)

of the City of San Saba ; that this municipality owned utilities
(Municipal Owned Utility)

serves San Saba County, Texas and
(name of county)

The City of San Saba ,
(name of municipality)

Texas; and that the enclosed is a copy of the Emergency Operations Plan.

(municipal representative's signature)

Subscribed and sworn to before me this the 4th day of March ,

20 24 .

(Seal)

Notary Public in and for the State of Texas

SABRINA MAULTSBY
Notary Public, State of Texas
Comm. Expires 10-31-2025
Notary ID 129611945

Sabrina Maultsby
Print or Type Name of Notary Public

My Commission Expires 10/31/2025

CITY OF SAN SABA
EOP TABLETOP MEETING
ATTENDANCE LIST
MEETING DATE: FEBRUARY 28, 2024

NAME	POSITION
Denver Daniel	Electric Dept Supervisor
Glynn Meador	Electric Dept. Lineman
Scott Glaze	Public Works
Jacob Uptain	Elect. Dept. Lineman
Kyle Anderson	Elect. Dept. Lineman
Scott Edmonson	City MANAGER

City of San Saba

Emergency Operations Plan

EOP Information

Please fill in the information below as indicated

PWSID	TX2060001
Street Address	303 S CLEAR
City, State Zip Code	SAN SABA, TX 76877-0788
Phone number	325-372-5144
Population Served	3117
Prepared by	Sarah Fernandez, Jacob Martin LLC
Reviewed by	
Date completed	

PLAN DISTRIBUTION

Please fill in the recipient's name and title, the person who gave them the plan and on what date.

RECIPIENT/TITLE	DISTRIBUTED BY	DATE

CHANGE HISTORY

Please describe the changes made to this plan since its original development, who made the changes and on what date the changes were incorporated into this plan.

DESCRIPTION OF CHANGE	NAME/TITLE	DATE
EOP Information Updated on 02/28/2024 by:		
Denver Daniel- Electric Dept Superintendent, Glynn Meador- Electric Dept. Lineman,		
Scott Glaze- Public Works Director, Jacob Uptain- Electric Dept. Lineman,		
Kyle Anderson- Electric Dept. Lineman, Scott Edmonson- City Manager		
Population Information.		
Utility Information		
My Contact and Resources		

TABLE OF CONTENTS

UTILITY INFORMATION

During an incident, you need to have system information about your water utility readily available for your personnel, first responders, repair contractors/vendors, the media, and other response partner agencies.

i Utility Overview

Provide basic information about your utility.

Utility Information	
PWSID	TX2060001
Utility name and address	City of San Saba 303 S CLEAR SAN SABA, TX 76877-0788
Owner	City of San Saba
Total population served and total service connections	Population: 3117 Service Connections: 1884
Name, title, phone number of primary contact (e.g., ERP Lead)	Ken Jordan, Mayor, 325-372-5144
Alternate contact	Scott Edmonson, City Manager, 325-327-8001 Scott Glaze, Public Works Director,325-372-7730

ii Personnel Information

Attach your personnel roster here or fill out the table below.

Personnel			
Name and Title	**Job Duties and Responsibilities**	**Contact Information**	**Emergency Information**
Ken Jordan	Mayor	325-372-5144	
Scott Edmonson	City Manager	325-372-8001	
Scott Glaze	Public Works Director	325-372-7730	
Denver Daniel	Electric Department Superintendent	325-372-7568	

1 RESILIENCE STRATEGIES

This section contains strategies and resources to improve the resilience of the system, including the physical security and cybersecurity of the system.

1.1 Emergency Response Roles

External Response Partner Roles

Name/Title	Organization	Responsibilities During an Incident
Local Partners		
Jay Hall	County Emergency Management/EOC	Coordinate with TDEM (region 6)
Dispatch	911	Provide fire, police and medical services
Chief of Police	Police	City policing
Volunteer Fire Chief Chris Stewart	Fire/HazMat	City fire response
San Saba County	LEPC	Coordinate with TDEM (region 6)
Kenneth Jordan Mayor	Elected officials	Top official
City of San Saba	Power utility	Main power
Health Dept.	Health department	Drinking water testing and health preparedness
	Contractor/vendor	
	Industry representative	
	Mutual aid	
Scott Glaze Public Works Director	Other	
Scott Edmonson City Manager	Other	
State Partners		
TDEM-(region 6)	Primacy Agency	All emergency needs
TX DSHS	Health department	Emergency preparedness
DPS	Police	Needs beyond local police
TxWARN	WARN	Utility assistance
DSHS	Laboratories	Unusual extra needs
	Other	
	Other	
Federal Partners		
Region 6	EPA regional office	Emergencies that require large scale response
Dallas	FBI field office	Federal issues
Dallas	CDC	Toxic or infectious
	Other	
	Other	

Describe the roles and responsibilities for key utility and external response partner personnel in the table below

1.3.2 External Response Partner Communication

List all external response partners, their response role or position as well as contact information.

External Response Partner Contact List

Organization or Department	Point Person Name or Position	Phone	Alternate Phone	Email or Website
Local Partners				
San Saba County Emergency Management/EOC	Marsha Hardy	325-372-8570		emergencymgmt@co.san-saba.tx.us
911	Dispatch	911		
Police	John Bauer	325-372-8200		police@centex.net
Volunteer Fire/HazMat	Chris Stewart	325-372-1082		
EMS	Hamilton County EMS	325-372-5551		
Public Works Director	Scott Glaze	325-372-7730		publicworks@centex.net
State Partners				
Primacy agency	Jay Hall TDEM Region 6	210-531-4336		Jay.hall@tdem.texas.gov
Health department	Tx DSHS	888-963-7111		Health Emergency Preparedness
Police	DPS	512-424-2000		https://www.dps.texas.gov/tle/contact
WARN	TXWARN	866-989-9276		info@txwarn.org
Laboratories	DSHS	512-779-7318		labinfo@dshs.texas.gov
LCRA Environmental Laboratory Services		877-362-5272		Environmental.lab@lcra.org
Federal Partners				
EPA regional office	Region 6	214-665-8318		Epa.gov
FBI field office	Dallas	972- 559-5000		Fbi.gov
CDC	Dallas ATSDR	214-665-8016	800-232-4636	cdc.gov
Other				

1.4 Media Outreach

List contact information for all media outlets that your utility may coordinate with during notification efforts. Additionally, include existing risk communication procedures, such as composing and delivering messages (e.g. message mapping), or reference an existing Risk Communication Plan.

Contact List

Organization or Department	Point Person Name & Position	Phone	Alternate phone	Email or Website
Utility social media coordinator	*Denver Daniel Electric Department Superintendent*	*325-372-7568*		sselectric@centex.net
Newspaper – Paper	San Saba News & Star	325-372-5115		www.sansabanews.com
Newspaper –Online				
Radio station-	KNUZ	325-372-5225		106.3sansaba@gmail.com
TV	KXAN	512-476-3636		*news@kxan.com*
TV	KCEN-Tv	254-859-5481		news@kcentv.com
TV	Kwtxtv	254-776-1330		news@kwtx.com
City website	www.sansabatexas.com			

2 EMERGENCY PLANS AND PROCEDURES

This section contains plans and procedures that can be implemented in the event of a malevolent act or natural hazard that threatens your utility's ability to provide power.

2.1 Core Response Procedures

Core procedures are the "building blocks" for incident specific response procedures, as they are typically implemented across a broad variety of incidents (e.g. flood). List all your core procedures here.

Access	
Item	**Description**
Debris clearing	*Public Works Director designates crews*
Alternate routes	*Police Chief designates any needed alternate routes*
Identification badges	*Operations Chief designates staff to prepare additional identification*
Other	

Physical Security	
Item	**Description**
Access control procedures	*Operations Chief designates City staff to control access supported by city police*
Restricted areas	*Operations Chief designates city staff to mark and control restricted areas supported by city police*
Evidence protection measures	*City police ensure any evidence is collected and processed*
Security culture	*Operations Chief designates a Safety Officer to coordinate with city police to provide security net*
Other	

Cybersecurity	
Item	**Description**
Disconnect procedure	*Operations Chief designates city IT persons to disable connectivity as needed*
Notification	*Operations Chief designates city IT person to provide information to PIO for distribution*
Assess procedure	*Operations Chief designates city IT person to provide updates on situation*
Implementation processes	*Operations Chief designates city IT person to process needed repairs*
Documentation	*Operations Chief designates city IT person to document all IT steps*
Other	

Power Loss	
Item	**Description**
Backup power systems	*Permanently installed auxiliary generator*
Power utility	*City of San Saba*
Fuel plan	*500 gal of diesel fuel stored at 900 E. Storey San Saba, TX 76877.*

2.2 Incident-Specific Response Procedures

Insert applicable Incident-Specific Response Procedures (ISRPs), specialized procedures tailored to an incident type. Incidents may include, but are not limited to, the following:

- Incident Command System (ICS)
- Cybersecurity & Cyber Intrusion
- Drought
- Extreme Cold and Winter Storms
- Extreme Heat
- Flooding
- Tornado
- Wildfire
- Power Outage Generators
- Pandemic

EPA's website provides a number of incident action checklists (IACs) that you can use to help develop your own ISRPs. EPA also published the Prepared for Contamination in Your Distribution System? guidance that can help you develop a distribution system contamination ISRP.

4 DETECTION STRATEGIES

This section contains strategies that can be used to aid in the detection of malevolent acts or natural hazards that threaten the security or resilience of the system.

List the detection strategies and methods your utility uses to aid in the detection of malevolent acts or natural hazards. Also list the corresponding procedure to be used if the threat is detected.

Detection Strategies

Threat	Detection Method	Procedure
Unauthorized entry	• *Alarm from intrusion detection system* • *Personnel interaction*	*Call 911*
Cyber intrusion	• *Automated IT and operation technology (OT) system intrusion detection monitoring* • *Notification from utility staff*	*Cyber Incident Action Checklist*
Hazardous chemical release	• *Chlorine gas in air monitors*	*Call fire department*
Flood	• *Notification from Army Corp*	*Flood Incident Action Checklist*
Power outage	• *Notification from energy provider* • *Alarm from line power sensor*	*Generator Start-up Checklist; Fuel Operations*
Pandemic	• *Notification from health department*	*Pandemic Checklist*
Cold	• *Weather Service alerts*	*Cold and extreme weather checklist*

Incident Command System

ICS

ICS 7

Introductory ICS training is recommended for all utility pRrs n el.

- ICS-100 Introduction to the Incident Command System
- IS-700 NIMS, an Introduction

Additional courses are also recommended for utility personnel who may activate or lead an incident

- ICS-200 ICS for Single Resources and Initial Action Incidents
- ICS-300 Intermediate ICS for Expanding Incidents
- ICS-400 Advanced ICS
- IS-800 National Response Framework (NRF), an Introduction

Details on the training courses are available at the following locations·

- FEMA's ICS "Resource" s Center
  ecT d s *for ICS-100, ICS-200, 15-700, and 15-800* are available at EPA's
  at) B'esil an ›nno w b ee

Discussion-Based Exercises

Discussion-based exercises are normally used as a starting point in a progressive building-block approach leading up to operations-based exercises. They include:

- *Seminars:* used to orient participants to, oT provide an overview of, authorities, strategies, plans, policies, proceduTes, protocols, resources, concepts, and ideas.
- *Workshops:* similar to seminars, workshops are typically used to test new ideas, processes, or procedures; train groups in coordinated activities; and build products like a DSCRP. Workshops often require more participation than seminars, and may use breakout sessions to explore parts of an issue with smaller groups.
- *Tabletop Exercises:* used to assess plans, policies, and procedures or to assess types of systems needed to guide the prevention of, response to, or recovery from a defined/simulated incident. Tabletop exercises are typically aimed at facilitating an understanding of concepts/plans, identifying strengths and areas for improvement, and/or achieving changes in perception.

Discussion-based exercises are appropriate tools to develop procedures and to familiarize utility personnel and response partners with their roles and responsibilities in implementing these procedures. Table 1 provides an example of discussion-based exercises that can be conducted to support implementation ot a DSCRP. They can be used and modified to train utility personnel and external response partners.

Table 1 Examples of Discussion-based Exercises to Support Implementation of a DSCRP

Title	Exercise Type	Description
DHS FEMA/NIMS IS-100 and IS-700	Seminar	Introduces ICS procedures and NIMS for utility personnel
DSCRP Development Workshop	Workshop	Discusses development of the DSCRP including confidence/impact assessments, phase decision trees, and response partner involvement. This may include both utilities and response partner personnel.
DSCRP Orientation Training	Seminar	Provides training to utility personnel on roles/responsibilities as outlined in the DSCRP.
DSCRP Tabletop Exercise	Tabletop Exercise	Presents contamination scenarios to utility and response partner personnel, allowing them to discuss procedures in the DSCRP during a simulated incident.

Title	Exercise Type	Description
Site CharacterizatiOM	Workshop and Tabletop Exercise	Uses contamination scenarios to demonstrate the procedures that guide the development of an SC&SP. This training is intended for the incident command / management personnel that would be responsible for planning site characterization activities irt response to a specific incident. Response partners that would be involved in these activities (e.g., HazMat) may also be included

Operations-Based Exercises

Once the DSCRP has been drafted and personnel are trained and prepared, the overall DSCRP should be tested to identify necessary corrections and opportunities for improvement. This evaluation can be done through implementation of operations-based exercises.

Operations-based exercises are characterized by actual mobilization of personnel and resources, and usually held over longer periods of time, from several hours to a couple of days. Operations-based exercises can be used to validate plans, procedures, policies, and agreements; clarify roles and responsibilities; and identify resource gaps. They include:

- *Drills:* used to test a single specific operation or function in a response plan through a coordinated/supervised activity (e.g., practice using equipment, develop/test new policies or procedures, practice and maintain current skills).
- *Functional Exercises:* a single or multi-agency activity designed to evaluate capabilities and multiple functions using a simulated response. Functional exercises are typically focused on exercising and evaluating plans, policies, and procedures. They often engage personnel involved in management, direction, command, and control functions. They are conducted in a realistic, real-time environment; however, movement of personnel and equipment is usually simulated.
- *Full-Scale Exercises.* a multi-agency, multi-jurisdictional activity involving actual deployment of resources in a coordinated response as if a real incident had occurred. This facilitates the evaluation of field procedures concurrently with the management processes that guide implementation of the DSCRP. A full-scale exercise is typically used to assess plans, procedures, and coordinated responses under crisis conditions.

These exercises often follow discussion-based exercises, which provide basic training on procedures. Overall, operations-based exercises are more complex and detailed than discussion-based exercises and require more time to coordinate, assemble, and conduct. Table 2 provides an example of operations-based exercises that can be conducted for a DSCRP.

Table 2 Examples of Operations-based Exercises to Support Implementation of a DSCRP

Title	Exercise Type	Description
Site Characterization and Sampling	Drill	Tests and practices implementation of site characterization and triggered sampling procedures/equipment for field response personnel.
Laboratory Analysis	D sh	Tests and practices the collection, transport, and analysis of samples and reporting of results for field and laboratory personnel.
Public Notification	Drill	Practices the procedures for assessing when a public notification is necessary, coordinating with primacy/public health agencies, and creating/issuing notifications.
Utility Functional Exercise	Functional Exercise	Exercises roles for utility personnel and/or response partners, tests all of the procedures in a simulated environment (no personnel or equipment movement), and identifies improvements.

Title	Exercise Type	Description
Utility and Response Partner Full-Scale Exercise	Full-Scale Exercise	Exercises roles for utility personnel and response partners in a field environment (NIl deployment and mobllJza0on of personnel and equipment), tasts the full implementation of the DSCRP involving the majority of tha OSCRP procedures, and identifies improvements.

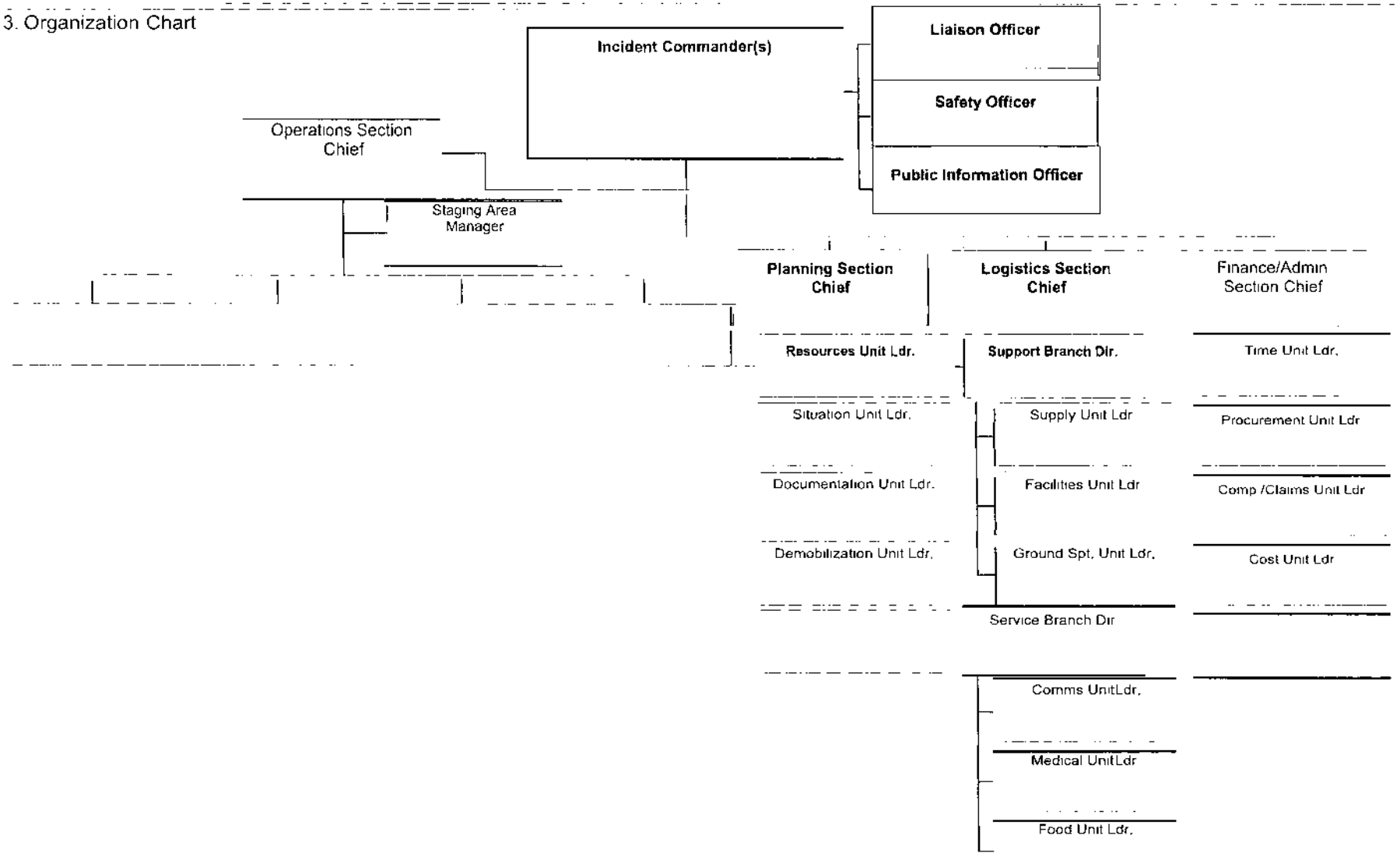
As noted in Tables 1 and 2 several exercise types (Tabletop, Functional, and Full-Scale Exercises) involve the identification ol'improvements to be made to the DSCRP and/or other plans. Improving response plans is a significant outcome of exercises and is necessary to ensure that the DSCRP remains relevant and useful over time. Following an exercise, recommended improvements are typically captured in an After-Action Report/Improvement Plan (AAR/IP). FEMA, as part of its HSEEP resources, offers an AAR/IP template.

INCIDENT ORGANIZATION CHART (ICS 207)

1. Incident Name.

2. Operational Period: Date From: Date To:
Time From: Time To:

3. Organization Chart



ICS 207 IAP Page 4. Prepared by: Name: Position/Title: Signature: Date/Time:

ICS 207
Incident Organization Chart

Purpose. The Incident Organization Chart (ICS 207) provides a visual wall chart depicting the ICS organization position ssignments for the incident. The ICS 207 is used to indicate what ICS organizational elements are currently activated and the names of personnel staffing each element. An actual organization will be event-specific. The size of the organization is dependent on the specifics and magnitude of the incident and is scalable and flexible. Personnel responsible for managing organizational positions are listed in each box as appropriate.

Preparation. The ICS 207 is prepared by the Resources Unit Leader and reviewed by the Incident Commander. Complete only the blocks where positions have been activated, and add additional blocks as needed, especially for Agency Representatives and all Operations Section organizational elements. For detailed information about positions, consult the NIMS ICS Field Operations Guide. The ICS 207 is intended to be used as a wall-size chart and printed on a plotter for better visibility. A chart is completed for each operational period, and updated when organizational changes occur.

Distribution. The ICS 207 is intended to be wall mounted at Incident Command Posts and other incident locations as needed, and is not intended to be part of the Incident Action Plan (IAP). All completed original forms must be given to the Documentation Unit

Notes:

- The ICS 207 is intended to be wall mounted (printed on a plotter) Document size can be modified based on individual needs.
- Also available as 8'/ x 14 (legal size) chart.
- ICS allows for organizational flexibility, so the Intelligence/Investigative Function can be embedded in several different places within the organizational structure.
- Use additional pages if more than three branches are activated. Additional pages can be added based on individual need (such as to distinguish more Division/Groups and Branches as they are activated).

1	Incident Name	Print the name assigned to the incident.
2	Operational Period • Date and Time From • Date and Time To	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
3	Organization Chart	• Complete the incident organization chart • For all individuals, use at least the first initial and last name. • List agency where it is appropriate, such as forUnified Commanders. • If there is a shift change during the specified operational period, list both names, separated by a slash.
4	Prepared by • Name « Position/Title • Signature • Date/Time	Enter the name, ICS position, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).

Cybersecurity & Cyber Intrusion

Incident Action Checklist – Cybersecurity

For on-the-go convenience, the actions in this checklist are divided up into three "rip & run" sections and provide a list of activities that utilities can take to prepare for, respond to and recover from a cyber incident. You can also populate the "My Contacts" section with critical information that your utility may need during an incident.

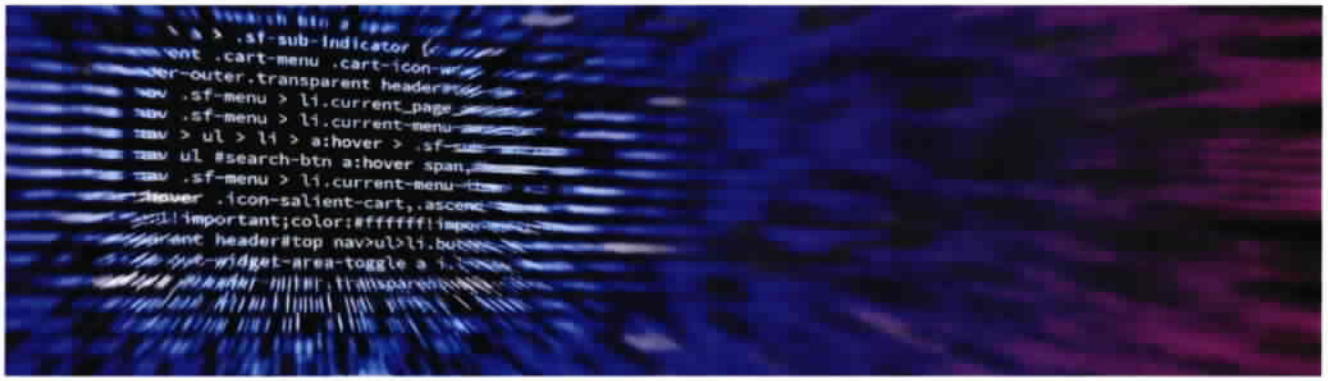
Cyber Incidents and Utilities

Cyberspace and its underlying infrastructure are vulnerable to a wide range of hazards from both physical attacks as well as cyberthreats. Sophisticated cyber actors and nation-states exploit vulnerabilities to steal information and money and are developing capabilities to disrupt, destroy or threaten the delivery of essential services.

As with any critical enterprise or corporation, utilities must evaluate and mitigate their vulnerability to a cyber incident and minimize impacts in the event of a successful attack. Impacts to a utility may include, but are not limited to:

- Interruption of treatment, distribution or conveyance processes from opening and closing valves, overriding alarms or disabling pumps or otherequipment
- Theft of customers' personal data such as credit card information and social security numbers stored in on-line billing systems
- Defacement of the utility's website or compromise of the email system
- Damage to system components
- Loss of use of industrial control systems (e.g., SCADA system) for remote monitoring of automated treatment and distribution processes

Cyber incidents can compromise the ability of utilities to provide clean and safe water to customers, erode customer confidence and result in financial and legal liabilities. The following sections outline actions drinking water and wastewater utilities can take to prepare for, respond to and recover from cyber incidents.



Actions to Prepare for a CyberIncident

Utility

- [ ] Identify all mission critical information technology (IT) systems, considering business enterprise, process control and communications. Document the key functions of the mission critical objectives, and identify the personnel or entity responsible for operating and maintaining each IT system.

- [ ] Identify an overall IT security lead to coordinate with each IT system manager and oversee all cyber-related duties.

- [ ] Ensure that IT system managers enforce cybersecurity practices on all business enterprise, process control and communications systems. For example, verify adherence to user authentication, current anti-virus software and installation of security patches.

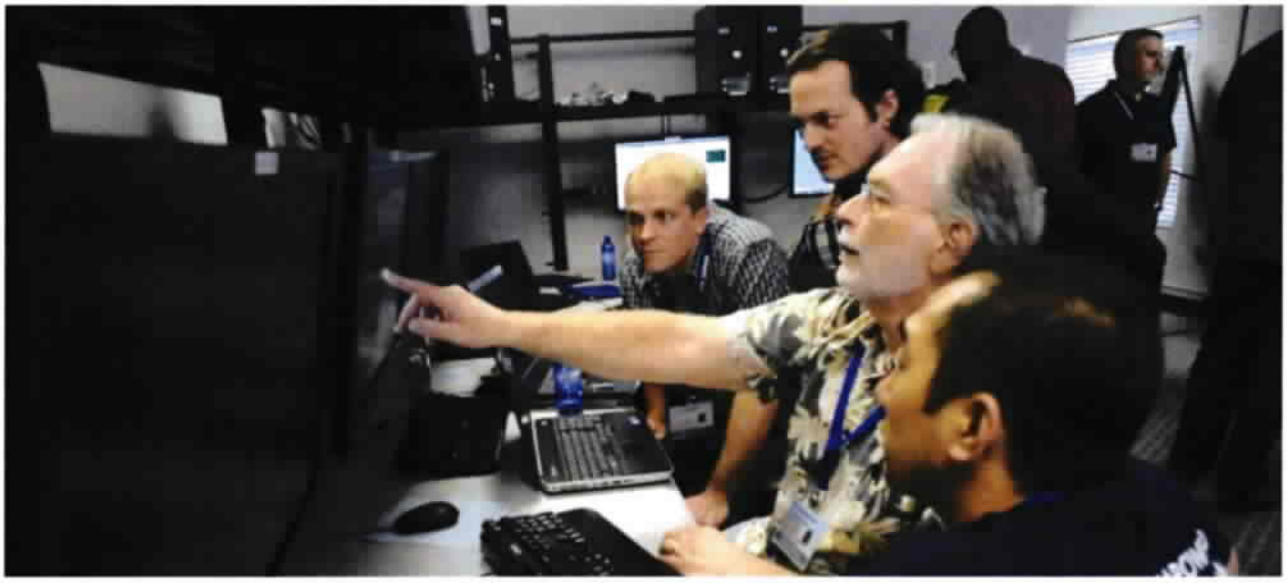
- [ ] Identify priority points of contact for reporting a cyber incident and requesting assistance with response and recovery. Include any state resources that may be available such as State Police, National Guard Cyber Division or mutual aid programs, as well as the Department of Homeland Security Cybersecurity and Infrastructure Security Agency (CISA) at https://www.cisa.gov/reporting-cyber-incidents.

- [ ] Review and update the utility's emergency response plan (ERP) to address a cyber incident impacting business enterprise, process control and communications systems. Account for all potential impacts on operations, and ensure emergency contacts are current.

- [ ] Prevent unauthorized physical access to IT systems through security measures such as locks, sensors and alarms.Include workstations and process control systems (e.g., programmable logic controllers or PLCs).

- [ ] Train all essential personnel to perform mission critical functions during a cyber incident that disables business enterprise, process control and communications systems. Include the manual operation of water collection, storage, treatment and conveyance systems.

- [ ] Conduct drills and exercises for responding to a cyber incident that disables critical business enterprise, process control and communications systems.



Actions to Prepare for a Cyber Incident *(continued)*

IT Staff or Vendor

- ☐ Establish a program for maintaining updated anti-virus software on all critical IT systems, along with rapid installation of all security patches.
- ☐ Set up an automatic back-up on critical systems and ensure the process is producing a readable, uncorrupted restore file on a routine basis.
- ☐ Implement rigorous user authentication, including multi-factor authentication where possible. Use individual accounts and unique passwords for each employee, and restrict IT system access privileges to the level needed for a user's duties.
- ☐ Restrict internet access to process control systems unless absolutely necessary.
- ☐ Where possible, separate process control system traffic from business traffic through the use of a firewall. If this is not possible, logically filter traffic through the use of a firewall.
- ☐ Identify all routes of remote access to IT systems. Eliminate remote access where possible, and restrict remaining access (e.g., do not allow persistent remote access tocontrol networks).
- ☐ Assess the use of additional strategies to protect IT systems, such as application whitelisting, network segmentation with restricted communication paths and active monitoring for adversarial system penetration.
- ☐ Conduct a detailed assessment of vulnerabilities in all mission critical IT systems. Consider use of the tools and subject matter experts provided by the DHS Cybersecurity and Infrastructure Security Agency (https://www.cisa.gov/cybersecurity). Develop an action plan to mitigate all significant vulnerabilities identified in the assessment.

Notes:

Actions to Respond to a CyberIncident

Utility

- [ ] If possible, disconnect compromised computers from the network to isolate breached components and prevent further damage, such as the spreading of malware. Do not turn off or reboot systems – this preserves evidence and allows for an assessment to be performed.
- [ ] Notify IT personnel and/or IT vendor of the incident and the need for emergency response assistance. In addition, DHS CISA can assist with IT system response and recovery (https://www.cisa.gov/reporting-cyber-incidents).
- [ ] Assess any damage to utility systems and equipment, along with disruptions to utility operations.
- [ ] Execute the utility ERP as needed, including notification of utility personnel, actions to restore operations of mission critical processes (e.g., switch to manual operation if necessary), and public notification (if required).
- [ ] Report the cyber incident as required to law enforcement and regulatory agencies.
- [ ] Notify any external entities (e.g., vendors, other government offices) that may have remote connections to the affected network(s).
- [ ] Document key information on the incident, including any suspicious calls, emails, or messages before or during the incident, damage to utility systems, and steps taken in response to the incident (including dates and times).

IT Staff or Vendor

- [ ] Review system and network logs, and use virus and malware scans to identify affected equipment, systems, accounts and networks.
- [ ] Document which user accounts were or are logged on, which programs and processes were or are running, any remote connections to the affected IT systems or network(s) and all open ports and their associated applications.
- [ ] If possible, take a "forensic image" of the affected IT systems to preserve evidence. Tools to take forensic images include Forensic Tool Kit (FTK) and EnCase.
- [ ] If possible, identify any malware used in the incident, any remote servers to which data may have been sent during the incident, and the origin of the incident. DHS CISA can assist with the forensic analysis (www.cisa.gov/reporting-cyber-incidents).
- [ ] Research and identify if any employee or customer personally identifiable information (PII) was compromised.
- [ ] Check the system back-up time stamp to determine if the back-up was compromised during the incident.
- [ ] Document all findings, and avoid modifying or deleting any data that might be attributable to the incident.

Actions to Respond to a CyberIncident

Notes:

Actions to Recover from a CyberIncident

Utility

- [ ] Continue to work with IT staff, vendors and integrators, government partners and others to obtain needed resources and assistance for recovery.
- [ ] Notify affected employees and customers if any PII was compromised.
- [ ] Submit an incident report through WaterISAC (866-H2O-ISAC). Membership is not required to submit a report.
- [ ] Develop a lessons learned document and/or an after action report (AAR) to documentutility response activities, successes, and areas for improvement. Create an improvement plan (IP) based on your AAR and use the IP to update your vulnerability assessment, ERP and contingency plans.
- [ ] Register for cybersecurity alerts and advisories from water sector and government partners to be aware of new vulnerabilities and threats. Two sources of cybersecurity alerts are WaterISAC, which has a basic membership that is free, and ICS-CERT (https://ics-cert.us-cert.gov/alerts).

IT Staff or Vendor

- [ ] Remove any malware, corrupted files and other changes made to IT systems by the incident.
- [ ] Restore IT systems as required (e.g., re-image hard drives, reload software). DHS CISA can assist with the IT system recovery (https://www.cisa.gov/reporting-cyber-incidents).
- [ ] Restore compromised files from a system back-up that has not been compromised.
- [ ] Install patches and updates, disable unused services and perform other countermeasures to harden the system against known vulnerabilities that may have been exploited.

Actions to Recover from a CyberIncident

Notes:

My Contacts and Resource

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
John Bauer- Police Chief	Law Enforcement	325-372-8200
Matt Karcher	IT Staff/Vendor	512-734-0052
David Bounds – Dedicated Controls	SCADA Staff/Vendor	972-632-8716
	DHS Cybersecurity and Infrastructure Security Agency (CISA)	
Bio- Chem (West, TX)	Local Laboratory	254-749-4320
	State Primacy Agency	
San Saba County Emergency Management	Local Emergency Management Agency	325-372-8570
Public Health Dept. Lampasas, TX	Local Health Department	512-556-5421
	WARN Chair	
	State Emergency Management Agency	

Resources

- Best Cybersecurity Practices (Water ISAC)
- Cyber Security Evaluation Tool (DHS ICS-CERT)
- Advisories (DHS ICS-CERT)
- Cybersecurity Advisors (DHS)
- DHS Cybersecurity and Infrastructure Agency (CISA)
- Cybersecurity Guidance and Tool (AWWA)

Notes:

Drought

Incident Action Checklist – Drought

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that utilities can take to: prepare for, respond to and recover from drought. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Drought Impacts on Utilities

Drought is a period of abnormally dry and/or unusually hot weather that is sufficiently prolonged to cause a serious hydraulic imbalance. Droughts normally develop and end slowly with impacts potentially lasting several years afterwards. Areas that have experienced a drought are also at an increased risk of flash flooding because the dry ground cannot effectively absorb rainwater. Droughts in the United States have caused cascading effects that may include, but are not limited to:

NOAA

- Loss of both surface water and groundwater
- Increased demand from customers (e.g., previously self-supplied communities that cannot meet the demand, agricultural customers requiring more electricity for irrigation)
- Deterioration of water quality and difficulties complying with drinking water regulations
- Increases in treatment and pumping-related costs
- Limited options for accessing other local water sources through interconnections due to increased regional demand and water scarcity
- Decreased capacity in alternative and supplementary sources due to high demand for emergency water by other industries and communities in the drought affected area

- Potential power interruptions due to high energy demand if drought is accompanied with unusually high temperatures
- Loss of fire suppression capabilities and powerplant cooling ponds
- Possible increased pressure to develop water reuse practices

The following sections outline actions utilities can take to prepare for, respond to and recover from drought. (Because drought and extreme heat events can coincide, please see the Extreme Heat Incident Action Checklist for intense heat-specific activities.)

NOAA

Example of Water Sector Impacts and Response to Drought

El Paso, Texas Drought Response

El Paso and surrounding areas in West Texas experienced severe drought conditions in 2011 and 2012. The arid region gets much of its water from snowmelt in the New Mexico and Colorado mountains, which experienced below-normal snow levels. The other source, southern New Mexico reservoirs, was also at record-low levels. The water shortage did not significantly impact El Paso's water supply for homes and businesses because in addition to conservation efforts, more well water and water from a water-desalination plant was used to augment the shortage.

Since 1963, to adapt to historic shortages, El Paso Water Utilities has supplemented its water supply (100 MGD capacity plant) with reclaimed water. The utility supplies city parks and other public spaces, construction sites, and industrial sites with almost 6 million gallons of reclaimed water per day.

Furthermore, El Paso Water Utilities has instituted a number of conservation efforts and incentive programs for customers, including watering restrictions, general use conservation activities and indoor and outdoor water efficiency rebates.

Despite the conservation efforts, farmers who rely on water for irrigation and grazing lands were hurt by the 2011-2012 water shortage. The El Paso County Water Improvement District #1 planned to allocate six inches of water per acre to its customers when the river water was first released from the dam, which is substantially lower than the previous year's allocation of 42 inches of water per acre, and below the full allocation of 48 inches per acre. The 2014 irrigation allocations are 18 inches per acre, which is still below the full allocation.

In an effort to secure sufficient supply for all customers, the city has purchased about 100,000 acres of land in outlying areas, acquiring the rights to the water that flows underneath. The utility also is considering future investment in water pipelines to pump water from supplies that are further away.

Source: El Paso Times, "El Paso – Area farmers to suffer as drought drags on"
Source: El Paso Water Improvement District #1, "Allocation for 2014 Irrigation Season"

FEMA

Actions to Prepare for a Drought

Planning

- ☐ Actively monitor local and regional drought conditions.
- ☐ Review and update your utility's emergency response plan (ERP) and ensure all emergency contacts are current.
- ☐ Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- ☐ Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- ☐ Monitor water supply and calculate how long water could be provided if the drought persists.
  - Actively monitor surface water levels and groundwater well levels, and identify the sustainable withdrawal rate for each
- ☐ Review and update your utility's drought management plan. Establish "triggers" or "threshold values" for drought conditions that will require action (e.g., if reservoirs fall below a certain level, a certain number of days without precipitation).
- ☐ Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- ☐ Review or develop your conservation plan and prepare for voluntary or mandatory conservation measures. Know your largest water users and be aware of usage patterns in order to determine the most effective conservation practices for your system (e.g., water fixture rebate programs, watering restrictions, facility audits to mitigate water loss).
- ☐ Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of drought and how your utility may have been impacted. Consider taking actions to mitigate drought impacts to the utility, including those provided in the "Actions to Recover from a Drought: Mitigation" section.
- ☐ Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

FEMA

Actions to Prepare for a Drought *(continued)*

- [ ] Determine if technical assistance programs are offered by the state, including wellhead protection programs for community water supplies. Assistance may involve:
  - Development and utilization of predictive water use models that assist in locating water for communities
  - Development and utilization of formal groundwater monitoring networks

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Potential drought and conservation measures
  - Outlining response activities, roles and responsibilities, and mutual aid procedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop or full-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate water source. Equipment, pumping rates, demand on the water sources, and any impacts on water rights laws need to be considered and addressed in the design and operations
  - Establishing communication protocols and equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to identify potential points of distribution for the delivery of an emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water.
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.
- [ ] Coordinate with other neighboring water systems to develop a water use plan, especially if your utility is in an agricultural area, to ensure there will be an adequate water supply by managing drawdown rates with agricultural (e.g., irrigation, livestock watering), industrial and public water supply needs.
- [ ] Coordinate water usage with neighboring irrigation districts that are supplied by the same aquifer.
- [ ] Coordinate with community leaders and high water-using organizations within the community to discuss potential drought and conservation measures.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Notes:

Actions to Prepare for a Drought *(continued)*

Actions to Prepare for a Drought *(continued)*

Communication with Customers

- [ ] Communicate with critical customers, high water users, and agricultural customers to discuss seasonal demand, irrigation practices and conservation measures.
- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely) and distributing them to customers using appropriate mechanisms, such as reverse 911.
- [ ] Develop outreach materials for the public (e.g., radio, social media, and bill stuffers) that clearly describe conservation measures and activities.
  - Become a WaterSense partner and download free water efficiency outreach materials to distribute to your customers.
- [ ] Consider establishing programs to encourage customers to conserve water year round, such as rebate programs, distribution of home retrofit kits and water conservation classes.

Facility and Service Area

- [ ] Conduct a water audit to detect and repair leaks throughout distribution system.
- [ ] Identify opportunities for groundwater recharge using stormwater and reclaimed water.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Maintain a full storage tank to assist with demand should there be a source loss, power failure or fire suppression needs.
- [ ] In the case of a power loss, ensure personnel are trained to shut down and start up the system manually.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- [ ] Document power requirements at the facility.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.

NOAA

Actions to Respond to a Drought

Planning

- [ ] Work with your regulatory agency to assist in identifying and approving alternate water supplies and operational or design changes.
- [ ] Monitor wildfire conditions and outlooks. See the Wildfire Incident Action Checklist for more information on how to prepare for wildfires.
- [ ] Monitor conditions for flash flooding, as dry ground cannot effectively absorb rainwater, and assess conditions of the watershed.

Coordination

- [ ] Communicate with public health officials, local EMA, and other partners to:
  - Discuss issues related to heat index emergencies, fires, and public health activities
  - Evaluate conditions and water use requirements related to HVAC systems required by hospitals and identify alternative means to supply water if the utility is unable to meet demand
- [ ] If needed, request or offer assistance (e.g., water buffalos, water sampling teams, generators) through mutual aid networks, such as WARN.

Communication with Customers

- [ ] Implement mandatory or voluntary water conservation efforts, and conduct regular outreach to customers.
- [ ] If water shortages or outages occur, notify customers of water advisories; consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

- [ ] Utilize pre-established emergency connections or set up temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.
- [ ] Monitor source water quantity (e.g., reservoir levels, stream flows, well levels, groundwater levels).
- [ ] Monitor water quality and adjust treatment, if necessary, as reduced water quantity and increased temperatures could change water chemistry.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.

Documentation and Reporting

- [ ] Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs that illustrate the drought conditions (with time and date stamp). Proper documentation is critical to requesting reimbursement.

Power, Energy and Fuel

- [ ] Use backup generators, as needed, to supply power to system components.
- [ ] Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to generators.

Winter Storms

Incident Action Checklist – Extreme Cold and Winter Storms

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that utilities can take to: prepare for, respond to and recover from extreme cold. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Extreme Cold and Winter Storm Impacts on Utilities

Cold weather brings with it the potential for freezing temperatures, heavy snowfall and ice incidents that can have multiple impacts on a community. Impacts to utilities may include, but are not limitedto:

- Pipe breaks throughout the distribution system, due to freeze/thawcycles
- Loss of power and communication lines
- Limited access to facilities due to icy roads or debris such as downed treelimbs
- Reduced work force due to unsafe travel conditions throughout the service area
- Source water quality impacts due to increased amount of road salt in stormwaterrunoff
- Potential flooding risk due to snowpack melt and ice jams (accumulations of ice in rivers orstreams)
- Potential surface water supply challenges as ice and frozen slush can block valves and restrictintakes

The following sections outline actions utilities can take to prepare for, respond to and recover from extreme cold and winter storms.

Example of Water Sector Impacts and Response to a Winter Storm

Kentucky 2009 Ice Storm

Kentucky experienced a severe winter storm in January 2009 that resulted in the largest power outage in the state's history. The storm began as a mixture of snow, followed by sleet and freezing rain coupled with strong winds. Although there was advanced notice of hazardous weather, the storm was more severe than anticipated and significant impacts to the water sector occurred. Ninety water utilities regulated by the Kentucky Public Service Commission (PSC) were impacted by the ice storm, and over 32,000 customers were without water at some point during the storm. One utility, the Hickory Water District in Graves County, Kentucky, lost all service during the storm. Although the Water District had approximately 48 hours of water storage, they were unable to supply water to their customers once that storage was exhausted, as they were without power and had no back-up power source.

A significant number of utilities had service restored the day after the ice storm as a result of prioritization by electric providers. Following the ice storm response, the PSC provided a number of recommendations to water and wastewater utilities on how to better prepare for future incidents. Recommendations included issuing consumer advisories prior to incidents that may result in service disruptions, considering the establishment of interconnections, and joining a mutual aid network, such as WARN.

Source: Kentucky Public Service Commission, "Ike and Ice: The Kentucky Public Service Commission Report on the September 2008 Wind Storm and the January 2009 Ice Storm"

Actions to Prepare for Extreme Cold and WinterStorm

Planning

- [ ] Actively monitor weather conditions for inclement weather.
- [ ] Review and update your utility's emergency response plan (ERP) and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of winter storms and how your utility may have been impacted. Consider taking actions to mitigate extreme cold, snow and ice storm impacts to your utility, including those provided in the "Actions to Recover from Extreme Cold and Winter Storms: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Outlining response activities, roles and responsibilities and mutual aid procedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop orfull-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be considered and addressed in the design andoperations
  - Establishing communication protocolsand equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to discuss:
  - How restoring system operations may have higher priority than establishing an alternative water resource
  - Potential points of distribution for thedelivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.

Actions to Prepare for Extreme Cold and WinterStorm

(continued)

- [ ] Work with community partners to ensure the utility is properly prioritized when determining plowing and road salting/sanding operations.
- [ ] Ensure credentials to allow access will be valid during an incident by checking with local law enforcement.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely due to extreme winter weather) and distributing them to customers using appropriate mechanisms, such as reverse 911. Keep in mind that the notice may need to be delivered prior to the storm to be effective.
- [ ] Instruct customers on how to prevent pipe breaks in their homes (e.g., insulating outdoor faucets, drip warm water from an indoor faucet) and what to do if a pipe breaks.

Facility and Service Area

- [ ] Inventory and order extra equipment and supplies, as needed:
  - Motors
  - Fuses
  - Chemicals (ensure at least a two week supply)
  - Cellular phones or otherwireless communications device
  - Emergency Supplies
    - Salt
    - Shovels/snow blowers
    - Tarps/tape/rope
    - Cots/blankets
    - First aid kits
    - Foul weather gear
    - Plywood
    - Flashlights/flares
    - Bottled water
    - Batteries
    - Non-perishable food
- [ ] Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.
- [ ] Prepare equipment and vehicles to start and run in cold weather (e.g., tune ups, batteries, engine block heaters).
- [ ] Develop a GIS map of all system components and prepare a list of coordinates for each facility.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Prior to a storm, apply road salt/sand as necessary, and pre-stage snowplow equipment.
- [ ] Consider installing wind or snow drift barriers at critical facilities.
- [ ] If surface water systems are equipped with intake heaters, ensure they are maintained and in working order before winter begins.

Personnel

- [ ] Identify essential personnel and ensure they are trained to perform critical duties in an emergency (and possibly without communication), including the shut down and start up of the system.
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.

Actions to Prepare for Extreme Cold and WinterStorm

(continued)

- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.

- [ ] Identify possible staging areas for mutual aid crews if needed in the response, andthe availability of local facilities to house the crews.

- [ ] Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.

- [ ] Document power requirements of the facility.

- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.

- [ ] Fuel vehicles and fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safe zone.

- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuelshortage.

- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergencyfuel.

Example of Water Sector Impacts and Response to a Winter Storm

2014 Northern Ohio Winter Water Shortage

In January 2008, ice accumulation on the intake valves for Avon Lake Regional Water severely reduced water production and caused the utility to ask customers to reduce usage. Avon Lake Regional Water's source water is Lake Erie, and it provides water to over 200,000 residential and commercial customers in multiple communities in and around the western Cleveland suburbs. The utility contracted with another company to put six additional pumps into Lake Erie to increase water flow to the plant. This involved workers cutting through ice 300 feet from shore to put new pipes in the water. The utility was forced to deliver two sets of automated phone calls to residents: the first asked them to reduce water use by refraining from washing clothes or taking long showers; the second asked people to stop using water altogether, if possible. Mayors in communities affected by the water shortages worked with their local EMAs to discuss contingency plans in the event of a fire. At least one county declared a State of Emergency in order to free up resources around the state if they wereneeded.

The City of Cleveland was able to supply water to several communities served by Avon Lake Regional Water Authority through interconnections. Its intakes were not affected, as they are farther out into Lake Erie where the water is deeper.

Source: The Cleveland Plain Dealer, "Water shortage reaching critical point in Avon as utility tries another way to pull water from the frozen lake"

Actions to Respond to Extreme Cold and WinterStorm

Coordination

- [ ] Notify your local EMA and state regulatory/primacy agency of system status.
- [ ] If needed, request or offer assistance (e.g., equipment, personnel) through mutual aid networks, such as WARN.
- [ ] Assign a representative of the utility to the incident command center or the EOC for the community.

Communication with Customers

- [ ] Notify customers of any water advisories and consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions.
- [ ] Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are intact.

Drinking Water Utilities

- [ ] Inspect the utility and service area for damage. Identify facility components (e.g., valve boxes) and fire hydrants that have been buried in snow, frozen in ice or are inaccessible.
- [ ] Systems that utilize surface water should monitor intakes, as ice and frozen slush can block valves and cause restrictions.
- [ ] Ensure pressure is maintained throughout the system and isolate those sections where it is not.
- [ ] Isolate and control leaks in water transmission and distribution piping.
- [ ] Monitor source water quality, develop a sampling plan and adjust treatment as necessary; increased usage of road salt within the service area may be a concern for utilities.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- [ ] Utilize pre-established emergency connections or setup temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.

Wastewater Utilities

- [ ] Inspect the utility and service area, including lift stations, for damage and power availability. Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.
- [ ] Notify regulatory/primacy agency of any changes to the operations or required testing parameters.
- [ ] Monitor the type and amount of bacteria in the treatment process, as severe cold can affect growth rates.
- [ ] Consider curtailing or ceasing secondary treatment wasting procedures during periods of heavy freezing rain or snowmelt to conserve bacteria and prevent it from washing out of the plant.

Documentation and Reporting

- [ ] Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs of damage at each work site (with time and date stamp). Proper documentation is critical to requesting reimbursement.

Actions to Respond to Extreme Cold and WinterStorm

(continued)

- [ ] Work with your local EMA on the required paperwork for public assistance requests.

Personnel

- [ ] Account for all personnel and provide emergency care, if needed. Caution personnel about known hazards resulting from severe winter weather.
- [ ] Deploy emergency operations and clean-up crews. Identify key access points and roads for employees to enter the utility and critical infrastructure; coordinate the need for snow and ice clearance with local officials and/or emergency management or prioritize it for employee operations.

Power, Energy and Fuel

- [ ] Use backup generators, as needed, to supply power to system components.
- [ ] Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to generators.
- [ ] Maintain contact with electric provider for power outage duration estimates.

Notes:

Actions to Recover from Extreme Cold and WinterStorm

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Assign a utility representative to continue to communicate with customers concerning a timeline for recovery and other pertinent information.

Facility and Service Area

- [ ] Complete damage assessments.
- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailoredinformation and application forms for various federal disaster funding programs.
- [ ] Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your vulnerability assessment, ERP and corresponding extreme cold and winter storm contingency plans.
- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency of extreme cold and intense snow and ice storms when planning for system upgrades (e.g., replacing weak pipes to reduce the risk of main breaks, landscaping and tree trimming to minimize debris issues).

Notes: ions to Recover from Extreme Cold and WinterStorms

Extreme Heat

Incident Action Checklist – Extreme Heat

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities utilities can take to: prepare for, respond to and recover from extreme heat. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Extreme Heat Impacts on Utilities

An extreme heat event or heat wave is a period of abnormally hot and/or humid weather, typically lasting two or more days. Though temperature thresholds that mark extreme heat events can vary by geographic location, these events can be extremely dangerous; in fact, heat is the top weather-related killer in the United States. Extreme heat can impact employee operations and power delivery, and can cause the public to seek relief. Extreme heat or heat wave impacts to utilities may include, but are not limited to:

- Loss of power and communication lines due to increased electricity demand
- Increased water demand due to higher temperatures, which could result in shortages
- Changes in source water quality related to increased water temperatures due to both higher air temperatures and higher temperatures of industrial discharges (e.g., cooling water used at power plants)
- Safety risks for staff working in the field for prolonged periods of time

EPA

The following sections outline actions utilities can take to prepare for, respond to and recover from an extreme heat event. (Because extreme heat events and drought often coincide, please see the Drought Incident Action Checklist for drought-specific activities.)

Example of Water Sector Impacts and Response to an Extreme Heat Event

Wisconsin Utility Anticipates Potential Water Shortages

Madison, Wisconsin, experienced a heat wave in June and July 2012, which resulted in an increase in water use. Due to the high temperatures and drier-than-normal conditions, the Madison Water Utility anticipated a potential water shortage and issued advisories for their customers to stay hydrated, but otherwise conserve water during the heat wave to reduce the risk of a shortage.

The utility advised customers to water their gardens and lawns only when needed, repair leaks in their homes, install water-saving devices such as aerators and flow regulators and use the most efficient setting for dishwashers and washing machines.

Source: City of Madison News Release, "Use Water Wisely in Heat Wave and Dry Period"
Source: NOAA Report "2012 Wisconsin Yearly Weather Summary"

Actions to Prepare for Extreme Heat

Planning

- [ ] Actively monitor weather conditions and extended weather forecasts.
- [ ] Review and update your utility's emergency response plan (ERP) and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- [ ] Monitor water supply and calculate how long water could be provided if increased demand persists.
    - Actively monitor surface water levels and groundwater well levels, and identify the sustainable withdrawal rate for each
- [ ] Establish "triggers" or "threshold values" for extreme heat conditions that will require action (e.g., if reservoirs fall below a certain level, if water quality measures exceed a specified level).
- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of extreme heat events and how your utility may have been impacted. Consider taking actions to mitigate drought impacts to the utility, including those provided in the "Actions to Recover from Extreme Heat Events: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs).
- [ ] Determine if technical assistance programs are offered by the state, including wellhead protection programs for community water supplies. Assistance may involve:
    - Development and utilization of predictive water use models that assist in locating water for communities
    - Development and utilization of formal groundwater monitoring networks

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
    - Outlining response activities, roles and responsibilities and mutual aid procedures (e.g., how to request and offer assistance)
    - Conducting joint tabletop or full-scale exercises
    - Obtaining resources and assistance, such as equipment, personnel, technical support or water
    - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be considered and addressed in the design and operations
    - Establishing communication protocols and equipment to reduce misunderstandings during the incident

Actions to Prepare for Extreme Heat *(continued)*

- [ ] Coordinate with other key response partners, such as your local EMA, to identify potential points of distribution for the delivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water.
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

- [ ] Communicate with critical customers, high water users and agricultural customers to discuss seasonal demand, conservation measures and irrigation practices.
- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely) and distributing them to customers using appropriate mechanisms, such as reverse 911.
- [ ] Develop outreach materials for the public (e.g., radio, social media, and bill stuffers) that encourage personal hydration, as well as materials that clearly describe conservation measures and activities.
  - Become a WaterSense partner and download free water efficiency outreach materials to distribute to your customers.

Facility and Service Area

- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Maintain a full storage tank to assist with demand should there be a source loss, power failure or fire suppression needs.
- [ ] In the case of a power loss, ensure personnel are trained to shut down and start up the system manually.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- [ ] Document power requirements of the facility.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergency fuel.

Actions to Respond to ExtremeHeat

Planning

- [ ] Work with your regulatory agency to assist in identifying and approving alternate water supplies and operational or design changes.
- [ ] Monitor wildfire conditions and outlooks. See the Wildfire Incident Action Checklist for more information on how to prepare for wildfires.

Coordination

- [ ] Communicate with public health officials, local EMA and other partners to:
  - Discuss issues related to extreme heat emergencies and public healthactivities
  - Evaluate conditions and water use requirements related to HVAC systems required by hospitals and identify alternative means to supply water if the utility isunable to meet demand
- [ ] If needed, request or offer assistance (e.g., water buffalos, water sampling teams, generators) through mutual aid networks, such as WARN.
- [ ] Work with your local EMA to establish cooling centers for the public.

Communication with Customers

- [ ] Implement mandatory or voluntary water conservation efforts and conduct regular outreach to customers.
- [ ] If water shortages or outages occur, notify customers of water advisories; consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

- [ ] Utilize pre-established emergency connections or set up temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.
- [ ] Monitor source water quantity (e.g., reservoir levels, stream flows, well levels, groundwater levels).
- [ ] Monitor water quality and adjust treatment, if necessary, as reduced water quantity and increased temperatures could change water chemistry.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- [ ] If possible, run pumps during off-peak hours when there is less demand on power and less risk of a power failure.

Actions to Respond to ExtremeHeat

Actions to Respond to Extreme Heat *(continued)*

Documentation and Reporting

- [ ] Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for disaster funds. When possible, take photographs that illustrate the extreme heat conditions (with time and date stamp). Proper documentation is critical to requesting reimbursement.

Personnel

- [ ] Ensure all staff working in the field are aware of the risks of extreme heat and that they take actions to avoid health risks and over-exertion (e.g., hydration, sunscreen, taking frequent breaks in the shade, wearing appropriate clothing).

Power, Energy and Fuel

- [ ] Fill vehicles and fuel tanks to full capacity; ensure that you have the ability to manually pump gas in the event of a power outage.
- [ ] Use backup generators, as needed, to supply power to system components.
- [ ] Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to the generators.
- [ ] Maintain contact with electric provider for power outage duration estimates.

Notes:

Actions to Respond to Extreme Heat *(continued)*

Actions to Recover from Extreme Heat Event

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Continue to communicate with customers concerning water conservation measures and practices.

Facility and Service Area

- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs.

- [ ] Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your vulnerability assessment, ERP and extreme heat contingency plans.

- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency of extreme heat waves when planning for system upgrades, such as installing energy efficient pumps/ equipment to minimize power demands.

Notes:

Actions to Recover from Extreme Heat Events

My Contacts and Resource

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
Marsha Hardy	Local EMA	325-372-8570
TDEM	State EMA	512-424-2138
Jay Hall TDEM Region 6	State Primacy Agency	210-531-4336
	WARN Chair	
City of San Saba	Power Utility	325-372-5144

Planning

- Incident monitoring:
  - U.S. Hazards Assessment (National Oceanicand Atmospheric Administration [NOAA])
  - Mean Heat Index Forecasts (NOAA)
  - Watch, Warning, and Advisory Display (NOAA)
  - U.S. Drought Monitor (National DroughtMitigation Center, NOAA, U.S. Department of Agriculture [USDA])
  - U.S. Seasonal Drought Outlook (NOAA)
- Excessive Heat Events Guidebook (EPA)
- Living with Weather: Heat Waves (Midwestern Regional Climate Center [MRCC])
- Ready.gov: Extreme Heat (FederalEmergency Management Agency [FEMA])
- Planning for an Emergency Drinking Water Supply (EPA)
- Emergency Response Plan Template (EPA)
- National Weather Service Weather Alerts (NOAA)
- All-Hazard Consequence Management Planning for the Water Sector (Water Sector Emergency Response Critical Infrastructure PartnershipAdvisory Council [CIPAC] Workgroup)
- Utility Risk Assessment Tool (EPA)
- How to Develop a Multi-Year Training andExercise (T&E) Plan (EPA)
- Climate Change and Historical Weather DataMaps (EPA)
- Tabletop Exercise Tool for Water Systems (EPA)
- Climate Resilience Evaluation and Awareness Tool (CREAT) (EPA)

Coordination

- Water/Wastewater Agency Response Network (WARN) (EPA)

Communication with Customers

- WaterSense (EPA)
- Communication During Emergencies (EPA)
- Community Resilience (EPA)

Facility and Service Area

- Water Audit Tool (American Water Works Association [AWWA])
- Response On-The-Go Mobile Application (EPA)

Power, Energy and Fuel

- Power Resilience Guide (EPA)
- Power Outage Incident Action Checklist (EPA)
- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)

Documentation and Reporting

- Federal Funding for Utilities In NationalDisasters (Fed FUNDS) (EPA)
- FEMA Public Assistance Factsheet (EPA)
- Reimbursement Tips for the Water Sector (EPA)

Mitigation

- Resilient Strategies Guide (EPA)
- Hazard Mitigation for Natural Disasters (EPA)
- Mitigation Ideas (FEMA)

Flooding

Incident Action Checklist – Flooding

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities utilities can take to: prepare for, respond to and recover from flooding. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Flooding Impacts on Utilities

Flooding is common throughout much of the United States and can be caused by heavy precipitation events, storm surge, levee or dam failures or inadequate drainage. These events often occur with little or no notice, and can cause extensive damage to infrastructure. Flooding impacts to utilities often include, but are not limited to:

- Infrastructure damage, possibly resulting in service interruptions
- Pipe breaks due to washouts, which could result in sewage spills or low water pressure throughout the service area
- Debris blockage at an intake or unearthed water and wastewater lines due to fallingtrees
- Loss of power and communication lines
- Combined sewer overflows (CSOs)
- Water quality changes to source waters and treated effluents, including increased turbidity, increased nutrients and other potential contaminants
- Restricted access to the facility due to debris, flood waters and damage to roadways from washouts and sinkholes
- Loss of water quality testing capability due to restricted facility and laboratory access and damage to utility equipment

The following sections outline actions utilities can take to prepare for, respond to and recover from floods.

Example of Water Sector Impacts and Response to a Flood

Warwick, Rhode Island Wastewater Treatment Plant Flooding

In March of 2010, a monthly record of nearly 16 inches of rain caused extreme flooding along the Pawtuxet River in the City of Warwick, Rhode Island, and left the Warwick Wastewater Treatment Plant completely flooded. Staff members were forced to move critical mobile equipment to higher ground as flood waters rose and threatened electrical equipment. The flood took the facility and six pumping stations along the Pawtuxet River offline. The Warwick Sewer Authority was forced to purchase five large portable pumps to keep up capacity.

Although the levees in Warwick were built three feet higher than the 100-year flood level, the river reached three feet above the levees during the 2010 flood. Rhode Island Department of Emergency Management (RIDEM) personnel recommended that the wastewater treatment plant be designed to higher flood levels (e.g., 500-year flood) to mitigate future damage from flooding events. Since the flood, the utility moved its Supervisory Control and Data Acquisition (SCADA) system to the second floor from the ground floor of the operations building. The utility has also purchased several new generators and other energy efficient equipment.

Source: Brown University Center for Environmental Studies, "Emergency Management in Rhode Island: A Look at the State's Level of Preparedness and Management of Resources, Communication, and Infrastructure During the March 2010 Floods."

Source: Treatment Plant Operator Magazine, January 2011Issue, "Managers and operators at two Rhode Island treatment plants report experiences and lessons learned from the severe floods of March 2010."

Actions to Prepare for a Flood

Planning

- [ ] Monitor weather and stream/river flow conditions to anticipate potential flooding conditions. Sign up for US Geological Survey's (USGS) WaterAlert service to receive an email or text message alert when the river gauges that you have identified surpass specified parameters.
- [ ] Review and update your utility's emergency response plan (ERP) and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Consult Federal Emergency Management Agency (FEMA) flood maps (link provided in the Resources section of this document) to determine which locations in your service area are most vulnerable to flooding.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of flood events and how your utility may have been impacted; consult USGS's WaterWatch (link provided in the Resources section of this document) to review archived streamflow maps. Consider taking actions to mitigate flood impacts to the utility, including those provided in the "Actions to Recover from a Flood: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Outlining response activities, roles and responsibilities and mutual aidprocedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop orfull-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be consideredand addressed in the design andoperations
  - Establishing communication protocolsand equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to discuss:
  - How restoring system operations may have higher priority than establishing an alternative water source
  - Potential points of distribution for thedelivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water

Actions to Prepare for a Flood *(continued)*

- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.
- [ ] Ensure credentials to allow access will be valid during an incident by checking with local law enforcement.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

- [ ] Develop outreach materials to provide your customers with information they will need during a flood (e.g., clarification about water advisories, instructions for private well and septic system maintenance).
- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely) and distributing them to customers using appropriate mechanisms, such as reverse 911. Keep in mind that the notice may need to be delivered prior to the storm to be effective.

Facility and Service Area

- [ ] Inventory and order extra equipment and supplies, as needed:
  - Motors
  - Fuses
  - Chemicals (ensure at least a two week supply)
  - Cellular phones or other wireless communications device
  - Emergency Supplies
    - Tarps/tape/rope
    - Cots/blankets
    - First aid kits
    - Foul weather gear
    - Plywood
    - Flashlights/flares
    - Sandbags (often, sand must be ordered as well)
    - Bottled water
    - Batteries
    - Non-perishable food
- [ ] Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.
- [ ] Develop a GIS map of all system components and prepare a list of coordinates for each facility.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.

Notes:

Actions to Prepare for a Flood *(continued)*

Personnel

- [ ] Identify essential personnel and ensure they are trained to perform critical duties in an emergency (and possibly without communication), including the shut down and start up of the system.
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.
- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- [ ] Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- [ ] Encourage personnel, especially those that may be on duty for extended periods of time,to develop family emergencyplans.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- [ ] Document power requirements of the facility.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergencyfuel.

Actions to Respond to a Flood: With Advance Notice

Facility and Service Area

- [ ] Secure equipment; move electronics, equipment and important data to a water-tight facility or out of flood-prone areas. Determine areas outside of the floodplain where vehicles/equipment can be moved.
- [ ] Clear storm drains and set up sandbags to protect facilities in flood-prone areas. Place sandbags on the top of tanks so that backwash water is directed away from plant structures.
- [ ] Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that the utility has a two week supply of all chemicals on hand.
- [ ] Protect exposed lines or pipes that may become vulnerable due to streambank erosion.
- [ ] Fill storage tanks to full capacity to maximize storage and fill empty chemical storage tanks with water if a heavy precipitation event is anticipated, to prevent floating.
- [ ] Wastewater utilities should empty holding tanks, ponds and/or lagoons to prepare for an increase in flow and to minimize the chance of a release during heavy weather incidents.

Power, Energy and Fuel

- [ ] Fuel vehicles and fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safezone.

Actions to Respond to a Flood

Coordination

- [ ] Notify your local EMA and state regulatory/primacy agency of system status.
- [ ] If needed, request or offer assistance (e.g., equipment, personnel) through mutual aid networks, such as WARN.
- [ ] Assign a representative of the utility to the incident command post or the community's EOC.

Communication with Customers

- [ ] Notify customers of any water advisories and consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions.
- [ ] Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are intact.
- [ ] If necessary and possible, turn off all utilities associated with your facilities to prevent further damage and minimize electrical and explosive hazards.

Drinking Water Utilities

- [ ] Inspect the utility and service area for damage due to debris, downed trees and floodwaters. Identify facility components (e.g., valve boxes) and fire hydrants that have been buried, are inaccessible or have been destroyed.
- [ ] Ensure pressure is maintained throughout the system and isolate those sections where it is not.
- [ ] Isolate and control leaks in water transmission and distribution piping.
- [ ] Monitor water quality, develop a sampling plan and adjust treatment as necessary.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- [ ] Utilize pre-established emergency connections or setup temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.

Wastewater Utilities

- [ ] Inspect the utility and service area, including lift stations, for damage and power availability. Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.

Notes:

Actions to Respond to a Flood

Actions to Respond to a Flood *(continued)*

- ☐ Inspect all manholes and pipelines in flood-prone areas for inflow and infiltration after the flood waters recede.
- ☐ Consider suspending solid waste processing during periods of high flow to conserve bacteria and prevent it from washing out of the plant.
- ☐ Notify regulatory/primacy agency of any changes to the operations or required testing parameters.

Documentation and Reporting

- ☐ Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs of damage at each work site (with time and date stamp). Proper documentation is critical to requesting reimbursement.
- ☐ Work with your local EMA on the required paperwork for public assistance requests.

Personnel

- ☐ Account for all personnel and provide emergency care, if needed. Caution personnel about known hazards resulting from floods.
- ☐ Deploy emergency operations and clean-up crews. Identify key access points and roads for employees to enter the utility and critical infrastructure; coordinate the need for debris clearance with local emergency management or prioritize it for employee operations.

Power, Energy and Fuel

- ☐ Use backup generators, as needed, to supply power to system components.
- ☐ Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to generators.
- ☐ Maintain contact with electric provider for power outage duration estimates.

Notes:

Actions to Respond to a Flood *(continued)*

Actions to Recover from a Flood

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Assign a utility representative to continue to communicate with customers concerning a timeline for recovery and other pertinent information.

Facility and Service Area

- [ ] Complete damage assessments.
- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailoredinformation and application forms for various federal disaster funding programs.
- [ ] Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your vulnerability assessment, ERP and contingency plans.
- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency of intense flooding when planning for system upgrades (e.g., elevating critical utility assets above projected flood levels, waterproofing building access areas, using flood control methods to modify runoff, managing stormwater through green infrastructure).

Notes:

Actions to Recover from a Flood

My Contacts and Resource

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
Marsha Hardy	Local EMA	325-372-8570
TDEM	State EMA	512-424-2138
Jay Hall TDEM Region 6	State Primacy Agency	210-531-4336
	WARN Chair	
City of San Saba	Power Utility	325-372-5144

Planning

- Incident monitoring:
  - Quantitative Precipitation Forecasts (National Oceanic and Atmospheric Administration[NOAA])
  - Excessive Rainfall Forecasts (NOAA)
  - River Observations, Forecasts, and Experimental Long-Range Flood Risk (NOAA)
  - Coastal Flood Exposure Mapper (NOAA)
  - Flood Inundation Mapper (United States Geological Survey [USGS])
  - WaterNow (USGS)
  - WaterAlert (USGS)
  - WaterWatch (USGS)
  - Interactive Flood Information Map (NOAA)
- Map Service Center to find flood map by address (Federal Emergency Management Agency [FEMA])
- National Weather Service Weather Alerts (NOAA)
- Planning for an Emergency Drinking Water Supply (EPA)
- Emergency Response Plan Template (EPA)
- All-Hazard Consequence Management Planning for the Water Sector (Water Sector Emergency Response Critical Infrastructure PartnershipAdvisory Council [CIPAC] Workgroup)
- Utility Risk Assessment Tool(EPA)
- Climate Change and Historical Weather DataMaps (EPA)
- Tabletop Exercise Tool for Water Systems (EPA)
- Climate Resilience Evaluation and Awareness Tool (CREAT) (EPA)
- How to Develop a Multi-Year Training andExercise (T&E) Plan (EPA)
- Make a Plan (FEMA)

Coordination

- Water/Wastewater Agency Response Network (WARN) (EPA)

Communication with Customers

- Communication During Emergencies (EPA)
- Community Resilience (EPA)

Facility and Service Area

- Response On-The-Go Mobile Application (EPA)
- Emergency Response and Preparedness Florida WARN Best Management Practices for Water and Wastewater Systems (University of Florida Centerfor Training)

Power, Energy and Fuel

- Power Resilience Guide (EPA)
- Power Outage Incident Action Checklist (EPA)
- EPA Region 1 Water/Wastewater SystemGenerator Preparedness Brochure (EPA)

Documentation and Reporting

- Federal Funding for Utilities In National Disasters (Fed FUNDS) (EPA)
- FEMA Public Assistance Factsheet (EPA)
- Reimbursement Tips for the Water Sector (EPA)

Mitigation

- Resilient Strategies Guide (EPA)
- Hazard Mitigation for Natural Disasters (EPA)
- Flood Resilience: A Basic Guide for Waterand Wastewater Utilities (EPA)
- Mitigation Ideas (FEMA)

Tornado

Incident Action Checklist – Tornado

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that utilities can take to: prepare for, respond to and recover from a tornado. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Tornado Impacts on Utilities

Tornadoes can occur in any location with little to no notice. Tornadoes can have wind gusts from 65 to over 200 miles per hour (mph) and are often accompanied by floods, high straight-line winds up to 140 mph, hail and lightning. About 1,200 tornadoes occur in the United States each year, and they can have devastating impacts to utilities. Impacts may include, but are not limited to:

- Damage to infrastructure (e.g., storage tanks, hydrants, residential plumbing fixtures, distribution system) due to hail, wind, debris and flash flooding, resulting in loss of service and/or reduced pressure throughout thesystem
- Restricted access to the facility due to debris anddamaged roads
- Loss of power and communication lines
- Potential contamination due to chemical leaks from ruptured containers
- Severe water and pressure loss due to ruptured service lines in damaged buildings and broken fire hydrants from airborne debris

NOAA

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from a tornado.

Example of Water Sector Impacts and Response to a Tornado

Smithville, Mississippi 2011 Tornado

An EF-5 tornado with estimated winds of 205 mph and a half-mile wide base hit Smithville, Mississippi in April 2011, destroying 150 homes and several businesses and city facilities, including the water system. The utility's elevated storage tank was damaged and several pipes were bent due to a car striking the structure. The tornado also tore out appliances and plumbing fixtures from homes and destroyed at least three fire hydrants.

Both the drinking water and wastewater systems lost power immediately after the tornado hit, and half of the town was without water due to damage to infrastructure and the power outage. Generators were coordinated through the Mississippi Rural Water Association to provide temporary power. The drinking water and wastewater utilities conducted damage assessments and teams were quickly deployed to fix leaks, turn off meters in destroyed homes and restore service throughout the systems.

Source: NRWA's "Rural Water assists tornado-ravaged Mississippi"

Actions to Prepare for a Tornado

Planning

- [ ] Review and update your utility's emergency response plan (ERP) and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first.
- [ ] Develop an emergency drinking water supply plan and establish contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of tornado events and how your utility may have been impacted. Consider taking actions to mitigate tornado impacts to the utility, including those provided in the "Actions to Recover from a Tornado: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Outlining response activities, roles and responsibilities and mutual aidprocedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop orfull-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be consideredand addressed in the design andoperations
  - Establishing communication protocols and equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to discuss:
  - How restoring system operations may have higher priority than establishing an alternative water source
  - Potential points of distribution for thedelivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.
- [ ] Ensure credentials to allow access will be valid during an incident by checking with local law enforcement.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Actions to Prepare for a Tornado *(continued)*

Communication with Customers

- [ ] Develop outreach materials to provide your customers with information they will need after a tornado (e.g., clarification about water advisories, instructions for private well and septic system maintenance and information about tornado mitigation).
- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water) and distributing them to customers using appropriate mechanisms, such as reverse 911.

Facility and Service Area

- [ ] Inventory and order extra equipment and supplies, as needed:
  - Motors
  - Fuses
  - Chemicals (ensure at least a two week supply)
  - Cellular phones or other wireless communications device
  - Emergency Supplies
    - Tarps/tape/rope
    - Cots/blankets
    - First aid kits
    - Foul weather gear
    - Plywood
    - Flashlights/flares
    - Sandbags (often, sand must be ordered as well)
    - Bottled water
    - Batteries
    - Non-perishable food
- [ ] Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.
- [ ] Develop a GIS map of all system components and prepare a list of coordinates for each facility.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.

Personnel

- [ ] Identify essential personnel and ensure they are trained to perform critical duties in an emergency (and possibly without communication), including the shut down and start up of the system.
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.
- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- [ ] Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- [ ] Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.

Actions to Prepare for a Tornado *(continued)*

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- [ ] Document power requirements of the facility.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
- [ ] Fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safe zone.
- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergency fuel.

FEMA

Notes:

Actions to Respond to a Tornado

Coordination

- ☐ Notify your local EMA and state regulatory/primacy agency of system status.
- ☐ If needed, request or offer assistance (e.g., water buffalos, water sampling teams, generators) through mutual aid networks, such as WARN.
- ☐ Assign a representative of the utility to the incident command post or the community's EOC.

Communication with Customers

- ☐ Notify customers of any water advisories and consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

Overall

- ☐ Conduct damage assessments of the utility to prioritize repairs and other actions.
- ☐ Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are intact.

Drinking Water Utilities

- ☐ Inspect the utility and service area for damage. Identify facility components (e.g., valve boxes) and fire hydrants that have been buried, are inaccessible or have been destroyed.
- ☐ Ensure pressure is maintained throughout the system and isolate those sections where it is not.
- ☐ Isolate and control leaks in water transmission and distribution piping.
- ☐ Turn off water meters at destroyed homes and buildings.
- ☐ Monitor water quality, develop a sampling plan and adjust treatment as necessary.
- ☐ Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- ☐ Utilize pre-established emergency connections or setup temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.

Wastewater Utilities

- ☐ Inspect the utility and service area, including lift stations, for damage, downed trees and power availability. Inspect the sewer system for debris and assess the operational status ofthe mechanical bar screen. If necessary, run system in manual operation.
- ☐ Notify regulatory/primacy agency of any changes to the operations or required testing parameters.

Notes:

Actions to Respond to a Tornado

Actions to Respond to a Tornado *(continued)*

Documentation and Reporting

- ☐ Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs of damage at each work site (with time and date stamp). Proper documentation is critical to requesting reimbursement.
- ☐ Work with your local EMA on the required paperwork for public assistance requests.

Personnel

- ☐ Account for all personnel and provide emergency care, if needed. Caution personnel about known hazards resulting from tornadoes.
- ☐ Deploy emergency operations and clean-up crews (e.g., securing heavy equipment). Identify key access points and roads for employees to enter the utility and critical infrastructure; coordinate the need for debris clearance with local emergency management or prioritize it for employee operations.
- ☐ Ensure personnel are aware of potential hazards and delays while traveling within the affected service area (i.e., flat tires caused by debris, navigation issues caused by uprooted/missing street signs).

Power, Energy and Fuel

- ☐ Use backup generators, as needed, to supply power to system components.
- ☐ Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to the generators.
- ☐ Maintain contact with electric provider for power outage duration estimates.

Notes:

Actions to Recover from a Tornado

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Assign a utility representative to continue to communicate with customers concerning a timeline for recovery and other pertinent information.

Facility and Service Area

- [ ] Complete damage assessments.
- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs.
- [ ] Develop a lessons learned document and/or an after action report to keep a record of your response activities. Update your vulnerability assessment, ERP and contingency plans.
- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency and intensity of tornadoes when planning for system upgrades (e.g., ensure adequate backup power supply for key assets, pursue interconnections with neighboring utilities).

Notes:

Actions to Recover from a Tornado

My Contacts and Resource

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
Marsha Hardy	Local EMA	325-372-8570
TDEM	State EMA	512-424-2138
Jay Hall TDEM Region 6	State Primacy Agency	210-531-4336
	WARN Chair	
City of San Saba	Power Utility	325-372-5144

Planning

- Incident monitoring:
  - Storm Prediction Center (National Oceanic and Atmospheric Administration [NOAA])
- U.S. Tornado Climatology (NOAA)
- Enhanced F Scale for Tornado Damage (NOAA)
- Severe Weather 101: Tornado Basics (NOAA)
- National Weather Service Weather Alerts (NOAA)
- Planning for an Emergency Drinking Water Supply (EPA)
- All-Hazard Consequence Management Planning for the Water Sector (Water Sector Emergency Response Critical Infrastructure PartnershipAdvisory Council [CIPAC] Workgroup)
- Utility Risk Assessment Tool(EPA)
- Climate Change and Historical Weather DataMaps (EPA)
- Tabletop Exercise Tool for Water Systems (EPA)
- How to Develop a Multi-Year Training andExercise (T&E) Plan (EPA)
- Make a Plan (FEMA)
- Climate Resilience Evaluation and AwarenessTool (CREAT) (EPA)

Coordination

- Water/Wastewater Agency Response Network (WARN) (EPA)

Communication with Customers

- Communication During Emergencies (EPA)
- Community Resilience (EPA)

Facility and Service Area

- Response On-The-Go Mobile Application (EPA)
- Emergency Response and Preparedness Florida WARN Best Management Practices for Water and Wastewater Systems (University of Florida Centerfor Training)

Power, Energy and Fuel

- Power Resilience Guide (EPA)
- Power Outage Incident Action Checklist (EPA)
- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)

Documentation and Reporting

- Federal Funding for Utilities In National Disasters (Fed FUNDS) (EPA)
- FEMA Public Assistance Factsheet (EPA)
- Reimbursement Tips for the Water Sector (EPA)

Mitigation

- Resilient Strategies Guide (EPA)
- Hazard Mitigation for Natural Disasters (EPA)
- Mitigation Ideas (FEMA)

Wildfire

Incident Action Checklist – Wildfire

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that water and wastewater utilities can take to: prepare for, respond to and recover from wildfires. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident. This checklist is also available in abbreviated form in the Response On-The-Go App for your mobile phone or tablet. Access the app via the Apple App Store or Google Play Store on your mobile device and search "EPA Response On-The-Go".

Wildfire Impacts on Utilities

A wildfire is any instance of uncontrolled burning in grasslands, brush or woodlands. Wildfires can be caused by lightning, human carelessness, technological accidents, or arson. Wildfires present a direct risk to property and water and wastewater infrastructure assets, in addition to potential degradation of the water supply. In some cases, source water quality issues can persist for 5-10 years following a wildfire. Areas that have experienced a wildfire are also at an increased risk when there is flash flooding and resulting mudslides because the ground where vegetation has burned away cannot effectively absorb rainwater. In addition to watershed impacts, fire can have detrimental effects on the operation of drinking water and wastewater treatment, storage, collection and distribution systems. Often, post-fire impacts (including those impacts resulting from flash floods) are more detrimental to drinking water and wastewater systems than the fire itself. Impacts to drinking water and wastewater utilities may include, but are not limitedto:

- Infrastructure damage to the facility or distribution system due to proximity to the fire or firefighting activities
- Loss of water quantity due to increased withdrawals forfirefighting activities
- Source water quality changes due to increased nutrients and other pollutants, which can result in higher turbidity, algal blooms, potential odor and taste issues, and subsequent higher treatment costs
- Increased sediment in reservoirs as a result of runoff and flash floods from burned areas, which can affect water quality, and reduced reservoir capacity and effective service lifespan
- Increased sediment and debris in stormwater runoff following flash floods, impacting water quality and treatment processes
- Decreased water supply downstream, as loss of forest canopy can lead to increased evaporation and reduction in the amount of water stored insnowpack
- Compromised distribution systems caused by damage to pipes (i.e., melting) and potential release of contaminants into the water supply

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from wildfires.

Notes:

Examples of Water Sector Impacts and Response to a Wildfire

Carr Fire Impacts to California Water Systems

In July and August 2018, the 230,000-acre Carr Fire impacted the Whiskeytown National Recreation Area in Shasta County, California. The destructive fire led to the evacuation of over 36,000 people and destroyed over 1,000 structures. The fire also severely impacted the Clear Creek Community Services District (CSD), Shasta CSD, Keswick, French Gulch and Redding water systems in the following ways:

- Fire destroyed a system's main office and two pumpstations.
- Power outages combined with undersized generators led to treatment process disruptions for some systems. One community had to issue a boil water notice for 17 days.
- Some communities lost up to 95 percent of the homes in their service areas and dealt with extreme demand due to fire response and high leakage.
- Communication was extremely challenging, especially sharing public notifications with customers whose power was out or had evacuated.

Lessons learned by the impacted water systems included:

- Load test generators under peak demand conditions that mimic what may occur during a wildfire. A generator may perform well under normal operating conditions or during a single structure fire response but may not be adequate for extreme demand conditions.
- Identify options for sourcing additional generators if your generators are only designed to operate portions of your infrastructure during an emergency.
- Identify ways to share public notifications when normal communications have been disrupted.
- Build a relationship with local response partners, especially heavy water users (i.e., fire).
- Work with emergency responders during an emergency (i.e., local Emergency Operations Center).

Following the Carr Fire, the following mitigation actions were taken:

- The California Division of Drinking Water established bi-weekly meetings to discuss impacted source water sampling and to identify potential treatment options.
- Shasta CSD brought online two new pump stations made from cinder block with metals roofs, making them more fire resistant than the previous wood frame/siding construction.
- Shasta CSD and Keswick established an interconnection for redundancy.
- Redding has both groundwater and surface water sources. A pump station was built to provide treated groundwater through interconnections with Clear Creek CSD, Shasta CSD and Keswick.

Source: PACE Engineering, Shasta CSD Upper Brunswick Pump Station alongside remains of the old wood frame pump station after the fire.

Actions to Prepare for a Wildfire

Pre-Planning

- [ ] Identify critical infrastructure and develop contingency plans for loss of access and operations.
- [ ] Review and update your utility's emergency response plan (ERP) to include (but not limited to):
  - Updated emergency contacts.
  - Current GIS map(s) of all system components, facilities, and distribution lines, including coordinates for each facility.
  - Steps for shut down and start-up of system.
  - Steps for manual operation of all facilities.
  - Treatment adjustments to make based on raw water quality changes during and after fire, if necessary.
  - A fire-specific sampling plan that can be adjusted during the incident based on the location and extent of the fire relative to your system (includes groundwater wells as new MCL violations for nitrates and arsenic have been observed at groundwater systems following wildfires).
- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss roles and responsibilities and procedures, which may include bottled water, bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Develop a list of priority water customers (e.g., medical facilities, nursing homes, schools).
- [ ] Create a communications plan to ensure critical information is provided to your customers, including sample results and data, during and after an incident with the understanding that normal communications may be disrupted for an extended period of time.
- [ ] Complete pre-disaster activities to help apply for disaster funding (e.g., contact state/ local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs). Publicly-owned or private non-profit utilities may be eligible for federal reimbursement if a federal declaration is made.
  - Private for-profit utilities are not eligible for federal disaster funding and will need to rely on existing reserves, insurance, and loans.
- [ ] Ensure adequate personal protective equipment (PPE) is available for field employees.
- [ ] Conduct briefings, trainings and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Develop emergency evacuation and shelter in place procedures as pertinent to wildfires.

Coordination

- [ ] Coordinate with your local emergency responders and EMA to:
  - Understand how the local emergency operations center (EOC) and utility EOC will be activated and what your utility may be called on to do (e.g., keeping hydrants pressurized for firefighting), as well as how local emergency responders and the local EOC can support your utility during a fire response (e.g. assisting with defending a critical asset). If your utility has assets outside of the local EMA's jurisdiction, consider coordination efforts that should be done in those areas as well.
    - Provide locations of critical facilities with local emergency responders.
  - Identify an appropriate contact such as a Liaison Officer (LO) or Public Information Officer (PIO) or other position determined by the EMA that can provide your utility with situational awareness during an incident.

Actions to Prepare for a Wildfire *(continued)*

- Establish a prioritization matrix to balance system restoration versus establishmentof alternative sources of water.
- Work with your EMA to establish potential points of distribution for the delivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water.

☐ Meet with the fire agency that has authority in your utility's area. This could include a local fire department, state conservation and forestry offices, and/or the US Forest Service.

- Review plans (hydrant and reservoir locations, flow rates, allowable drawdowns).
- Discuss response activities, (e.g., fire suppression chemical use within watersheds or near well fields, how to defend and maintain accessibility to critical infrastructure).
- Identify hazards (e.g., oxidizers) and vulnerabilities at your utility.
- Ensure the fire agency's fire management plans are updated accordingly with your water system's critical infrastructure and contingency plans.

☐ Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network. This is especially important for utilities that lack adequate resources.

☐ Coordinate with WARN members and other neighboring utilities to:

- Outline response activities, roles and responsibilities, and mutual aid procedures (e.g., how to request and offer assistance such as equipment, personnel, or technical support).
- Establish interconnections between systems and agreements with the necessary approvals. Equipment, pumping rates and demand on the water sources need to be considered and addressed.
- Establish communication protocols and equipment to reduce misunderstandings during an incident.

☐ Coordinate with your local laboratories to ensure they have the capability and capacity to continue regular compliance sample analyses, as well as a potential surge of post-fire sample analyses (e.g., bacteriological, nitrate, nitrite, inorganic and volatile organic compounds).

☐ Coordinate with your identified priority water customers (e.g., hospitals, nursing homes) to obtain their contact information, map their locations, and develop a plan to restore those customers first or provide point-of-entry treatment options, in case of water service disruptions.

☐ Coordinate with local law enforcement to ensure utility credentials (or a local/state credential program) to allow access to utility assets in the incident area will be valid.

☐ Coordinate with your local emergency planning committee (LEPC), who may already have plans and procedures in place for a wildfire event in your community. Including the water sector in those plans is important.

☐ Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

☐ Determine a spokesperson and back-ups for communications with the public and media.

☐ Develop public notice and other outreach materials in coordination with the state drinking water and wastewater regulatory agencies to provide your customers with information on the safety of their water supply (e.g., boil water or do not use advisories, guidance for residents on what to expect) or operational status of their wastewater system including potential special considerations for wastewater resulting from clean-up and recovery efforts (e.g., what not to put down the drain).

- The Oregon Health Authority created a

Actions to Prepare for a Wildfire *(continued)*

wildfire-specific do not drink public notice, but be sure to work with your regulatory agency to ensure you are following appropriate state requirements. Links to other notice templates developed by other fire-prone states are listed in the Resources section.

☐ Review emergency public information protocols with local EMA and public health/primacy agencies. These protocols should include delivering water advisory messages (e.g., boil water) to customers using appropriate mechanisms, such as reverse 911, in conditions where normal communications may not be available.

Facility and Service Area

☐ Inventory equipment and supplies and consider storing in an accessible and fire-hardened area. Make a list and order extra supplies, such as:

- Pumps
- Fuses
- Chemicals (ensure at least a two-week supply)
- Cellular phones or other wireless communications device with backup battery
- Fuel for generators
- Sampling bottles, reagents, and equipment
- PPE
- Emergency Supplies
  - Tarps/tape/rope
  - Wrench or pliers
  - Matches and lighter
  - Cots/blankets
  - First aid kits
  - Sanitizer
  - Foul weather gear
  - Plywood
  - Flashlights/flares
  - Sandbags (sand must often be ordered as well)
  - Bottled water
  - Batteries
  - Non-perishable food with manual can opener
  - Battery-powered or hand crank radio

☐ Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.

☐ Fire-harden critical facilities and areas:

- Practice mechanical thinning, weed control, selective harvesting, controlled burns and creation of fire breaks on utility managed property, and encourage these practices on property that may directly impact the utility, its water supply and/or water quality.
- Prioritize upgrades to wood structures and flammable materials: wooden water tanks, tank roofs made of wood, wooden building siding, asphalt shingles etc. Consider replacement with non-combustible material and/or retrofit existing buildings to meet current building code.
- Address and, if possible, remove vegetation from around facilities located in medium to high fire danger zones. Consider paving directly around water tanks and other critical buildings or infrastructure to discourage vegetation under building eaves and replacing flammable vegetation with fire- resistant landscaping.
- Create a zone of defensible space of approximately 100 feet or more to protect utility equipment and facilities (e.g., wellheads, structures, supports to wires and transformers). Consult with your local fire department for specific recommendations or requirements.
- Install manual or automatic irrigation systems to provide wetting of components and groundcover for vulnerable areas (e.g., chlorine storage, control equipment buildings).

Actions to Prepare for a Wildfire *(continued)*

- [ ] Assess the possibility of and procedures for using raw or reclaimed water for fire suppression (prepare public notice and talking points).
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Back up essential records and data, and store in a fireproof safe or offsite facility. Cloud-based storage could allow for accessibility anywhere.

Personnel

- [ ] Identify essential personnel and ensure they are credentialed with local authorities to allow access to facilities during an incident.
- [ ] Ensure all essential personnel are trained to perform critical duties in an emergency (and possibly without communication).
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.
- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- [ ] Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- [ ] Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.
- [ ] Ensure field personnel have adequate PPE.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
  - Identify options for sourcing generators if needed.
- [ ] Document power requirements of the facility. Your local technical assistance provider may be able to help.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
  - Load test generators under peak demand conditions that mimic what may occur during a wildfire.
  - Identify options for sourcing additional generators if your generators are only designed to operate portions of your infrastructure during an emergency.
  - Ensure any generator location has proper ventilation and staff have training on generator safety.
  - The Public Safety Power Shutoff SOP Template, while developed for shutoffs, can help utilities plan for and recover from any power outage.
- [ ] For systems with generators, consider setting up all generators with automatic transfer switches so generators can start automatically if grid power is lost.
- [ ] Fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safe zone.
- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power

Actions to Prepare for a Wildfire *(continued)*

restoration, generators, and emergency fuel.

Actions to Respond to a Wildfire

Safety First

- [ ] Constantly assess the scene, know your surroundings, and move to safe spots.
- [ ] Pay attention to all emergency alerts, instructions, and evacuate immediately if told by authorities.
- [ ] Turn off air conditioning or air circulation systems.
- [ ] Detach any electrical garage doors.
- [ ] Watch for flames, falling debris, sinkholes, uneven ground, large objects, septic systems, explosive materials (propane tanks, etc.), items that puncture, downed power lines, loss of guardrails, safety signals, traffic lights and other typical safety features that are no longer in place, etc.
- [ ] Have an N-95 or other type of respirator available, if possible, to limit exposure to smoke and other toxic fumes.
- [ ] Wet debris to minimize the risk of inhaling dust particles.
- [ ] If returning from evacuation, remember that dangers could still exist for personnel such as hot spots, charred and fallen trees, downed power lines, smoldering and fallingdebris, sinkholes, mud and landslides, etc.
- [ ] Fatigue during extended periods of emergency work is common and quite dangerous. Be sure to get plenty of rest and stay alert, even outside of the disaster zone.
- [ ] Pay attention to driving conditions.
- [ ] Obey all traffic and construction signs.
- [ ] Carry a first aid kit and avoid unnecessary risk.

Plans and Procedures

- [ ] Execute your ERP, communications, and emergency drinking water supply plan, as needed.
- [ ] Work with your state regulatory agency to develop a fire incident-specific sampling plan that monitors raw water and finished water quality (both surface water and groundwater sources). The plan should identify target contaminants, a sample collection protocol, sampling locations (including raw water, point of entry, and distribution), and a data quality and management system.
    - Raw water sampling should include basic water quality parameters such asturbidity, total organic carbon (TOC), pH, alkalinity, iron, and manganese as noted in Oregon Health Authority's Post-Fire Monitoring Guidance for Drinking Water Systems, as well as bacteriological monitoring.
    - For any water systems with potentially impacted distribution systems, see EPA's Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires for information on how distribution systems may get contaminated and further considerations with sampling, analysis, and actions.

Coordination

- [ ] As soon as possible, reach out to your local EMA to maintain awareness of the situation and, if possible, to lend or receive assistance.
- [ ] Notify your local EMA and state regulatory agency of your system's operational status and any needs and maintain communication with both.
    - Coordinate on issuance of wateradvisories, as appropriate.
- [ ] If needed, request or offer assistance (e.g., equipment, personnel) through mutual aid networks, such as WARN.

Actions to Respond to a Wildfire *(continued)*

- [ ] Assign a utility representative to coordinate with the community's incident command post or EOC either virtually or in-person.
- [ ] Establish connection, if possible, with the fire cooperators meeting location for coordination with responding state and local fire agencies.

Communication with Customers

- [ ] Notify customers of any water restrictions or advisories (e.g., boil water, due not use, do not flush) and consider having your designated spokesperson collaborate with local media (television, radio, newspaper, etc.) and your local EMA (reverse 911, text alerts, etc.) to distribute the message.
    - If conditions are unknown, consider issuing a precautionary water advisory.
- [ ] If emergency water is being supplied, provide information on any distribution locations and logistics

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions if conditions are safe.
- [ ] Check that back-up equipment and facility components, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are operational. Be aware that there may be damage that cannot be seen. If needed, hire professionals to assess facilities, equipment, and instrumentation.
- [ ] Work with the local EMA to identify passable access roads and to ensure that utility facilities in forest areas are clearly identified.
- [ ] Notify your state regulatory agency of any damage, changes to operations or required testing parameters, and/or impacts to water quality or quantity.
- [ ] Prepare and deploy equipment as needed to support firefighting operations, such as tanker trucks and related pumping equipment, as well as bulldozers for the construction of firebreaks.

Drinking Water Utilities

- [ ] If possible, refill storage tanks each day to ensure maximum storage for demand, including fire suppression.
- [ ] Keep intakes and access hatches clear of debris.
- [ ] Surface water systems should evaluate the amount of burn area in the watershed contributing to the surface water intakes. The potential increased sediments loadings and estimated travel time from the burn area to the intake should be considered in preparing for future weather events until slope stabilization methods are applied.
- [ ] Surface water systems should conduct on-site jar testing to respond to changes in turbidity, TOC, non-organic matter and other water quality parameters that could affect treatment efficacy.
    - Maximize removal of non-organic material pre-disinfection to help reduce disinfection byproduct formation.
- [ ] Determine if any points in the distribution system lost pressure.
- [ ] Turn off services to burned homes.
- [ ] Repair leaks, starting with the most severe ones. Shut off areas where leaking affects the ability to keep water in the system until repairs can be made.
- [ ] Execute your fire incident sampling plan to monitor raw water and finished water quality.
- [ ] Utilize pre-established emergency connections or set up temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees and emergency personnel of the activated sites.

Actions to Respond to a Wildfire *(continued)*

Drinking Water Utilities with Contaminated Distribution Systems

☐ Work with your state regulatory agency to:

- Assess your system for possible contaminants.
- Create a sampling plan that identified target contaminants, sample collection protocols, sampling locations, and data quality and management.
- Issue appropriate drinking water advisories (boil water, do not drink, do not drink - donot boil, do not use), and update advisories as needed.
- Unidirectionally flush as soon as possible to expel any foreign material/substances and back-siphoned water, and minimize permeation of any VOCs intoinfrastructure.
  - Flushing should begin at the water source and proceed downstreamthrough the distribution system.
  - Multiple flush cycles may be necessary.
  - Obtain any necessary permits forproper disposal of contaminated waters.
  - Once the system mains are flushed, customers should be instructed toflush their building plumbing from the tap closest to the service connection to the furthest tap.
- Consider isolating areas of distribution to potentially prevent contaminationfrom flowing into unimpacted areas, but also evaluate negative impacts.
- Consider alternative water options immediately as returning to normal operations may take time.
- Continue to flush and sample untilservice connections can be cleared.
- Determine next steps, such as pipe or valve replacement, if flushing does not resolve the contamination.
- Provide customers with water sampling information and recommended actions as soon as possible.
- Determine if a long-term monitoring program for VOCs is appropriate and develop if needed.

☐ For more information on the sampling plan and actions to take if a system experiences distribution system impacts, please refer to EPA's Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires factsheet.

Wastewater Utilities

☐ Inspect the utility and service area, including lift stations, for damage and power availability.

☐ Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.

Notes: