



BACKGROUND

Many federal, state, territory, local, and tribal organizations conduct exercises of their various emergency plans for different hazards. An incident at a dam could be the scenario for an exercise or added as a component of a larger exercise to prepare stakeholders for dam-related incidents at dams. Federal, state, territory, local, and tribal governments often have training programs that include emergency management, communication, preparedness, planning, exercises, and other topics.

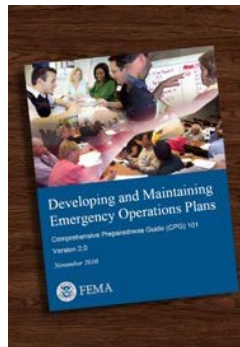
Purpose and Intended Audience

This Fact Sheet shares examples of pre-event exercises and training relating to dams and dam emergencies that were conducted prior to Hurricane Matthew in 2016 to help stakeholders better understand pre-event exercises and training efforts that will help them respond to potential dam emergencies.

The intended target audience for this Fact Sheet includes federal, state, territory, and local officials; tribal leaders; county and city engineers, planners, and emergency managers; dam owners and operators; building and property owners near or potentially affected by a dam failure; and other interested stakeholders.

EMERGENCY PLANS

Dam safety-related Emergency Action Plans (EAPs) and Emergency Operations Plans (EOPs) should be exercised with personnel involved in dam safety response to assess and validate capabilities, improve coordination, and identify strengths and areas for improvement. The results of the exercises are critical for evaluating the effectiveness of the plans. Training the appropriate personnel in emergency management, communication, preparedness, planning, and other topics can improve community resilience.



An EAP is a formal document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize

loss of life and property damage. Preparation of the EAP is typically the responsibility of the dam owner. For more information about EAPs, refer to FEMA P-64, *Federal Guidelines for Emergency Action Planning for Dams* (2013).

An EOP¹ is a plan developed and maintained by the government at the jurisdictional level for responding to a wide variety of potential hazards. It describes how people and property will be protected; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies, and other resources available; and outlines how these, among other actions will be coordinated. A state or community can include a dam-specific annex in its existing EOP. Refer to *Developing and Maintaining Emergency Operations Plans, Comprehensive*

¹ Any business, non-profit, or other organization can have an EOP. This Fact Sheet only addresses government EOPs.

Preparedness Guide (CPG) 101 (FEMA 2010) for guidelines on developing EOPs.

Examples of Actions Taken

Emergency management personnel in Wake County, NC, were all familiar with the Lake Benson Dam EAP or the State of North Carolina's dam EAP template, so guidance and threshold information were readily obtained to facilitate emergency actions in response to potential dam failures during Hurricane Matthew.

After Hurricane Matthew, Moore County, NC, developed a dam safety tabletop exercise and is sharing it with other dam operators. During the exercise, all dam operators review the EAP and all emergency responders are invited to join. A benefit of using the Woodlake Dam for this exercise is that fire department chiefs in the County are now very familiar with Woodlake Dam and its EAP.

PRE-EVENT EXERCISES

Pre-event exercises better prepare organizations, teams, or personnel to respond more effectively and efficiently to an emergency. In the absence of a real-world event, exercises offer the type of simulated environment necessary to test and validate existing plans and procedures in a realistic setting and should be considered an integral element of preparedness.

Exercises should be designed to engage participants and compel them to work together to manage the response to a hypothetical incident. Exercises can reveal strengths or weaknesses in elements such as plans, protocols, procedures, logistics, equipment, training, regulations, and laws, among others. Exercises enable organizations, teams, and participants to improve their operations and communications, and become more effective and efficient at their mission. The results of the exercises can help identify opportunities to improve response capabilities by revealing gaps, training, equipment needs, other shortfalls, or required changes that can be corrected before a real event occurs.

Many emergency management authorities follow the FEMA Homeland Security Exercise and Evaluation Program (HSEEP) framework; dam owners and other entities involved with the EAP should consider HSEEP when developing training and

exercise activities. See *Homeland Security Exercise and Evaluation Program* (DHS, 2013) for more information. Pre-event exercises can take many forms, as discussed below. One of the cornerstones of the HSEEP methodology is that the exercises are performed using a building block approach, where the complexity increases as participants move from the simpler seminars and workshops to the more complex full-scale exercises.

Examples of Actions Taken

Wake County, NC, reported that during annual training 2 months prior to Hurricane Matthew, Emergency Operations Center staff participated in a flood exercise that simulated a failure of Lake Benson Dam. The simulation required downstream notifications and rerouting of traffic along major roadways.

Providing realistic and complex exercises based on a current Threat and Hazard Identification and Risk Assessment (THIRA) benefited the actual emergency response following Hurricane Matthew.

Seminars and Workshops



Walkthroughs, orientation seminars, and workshops should be designed to familiarize team members with emergency response, business continuity, and crisis communications plans and compel them to carry out their roles and responsibilities as defined in the plans.

Seminars provide an overview of authorities, strategies, plans, policies, procedures, protocols, resources, concepts, and ideas. As a discussion-based exercise, seminars can be valuable for entities that are developing or making major changes to existing plans or procedures. Seminars can be similarly helpful when attempting to more fully understand the capabilities of interagency or inter-jurisdictional operations or gain access to them.

Workshops are similar to seminars except that participant interaction is increased and the focus is placed on a specific product, such as a standard operating procedure, an EOP, a continuity of operations plan, or a mutual aid agreement. To be effective, workshops should focus on a specific issue, and the desired objective, product, or goal should be clearly defined.

Tabletop Exercises

Tabletop exercises are discussion-based sessions in which key personnel assigned emergency management roles and responsibilities meet in an informal setting to discuss their roles during an emergency and their responses to a hypothetical, simulated emergency. A facilitator guides participants through a discussion of one or

more scenarios. The duration of a tabletop exercise depends on the audience, the scenario being exercised, and the exercise objectives. Many tabletop exercises can be conducted in a few hours, so they are cost-effective tools to validate plans and capabilities, identify strengths and areas for improvement, and can build consensus toward improving emergency response preparedness.

Functional Exercises

A functional exercise (FE) is a single or multi-agency activity designed to evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of functions. FEs are typically focused on exercising plans, policies, procedures, and staff members involved in management, direction, command, and control functions. An FE is conducted in a realistic, real-time environment; however, movement of personnel and equipment is usually simulated.

Functional exercises go beyond typical tabletop exercises by having the Command Post team make decisions, simulate the deployment of resources, and respond to new developments. In comparison to a full-scale exercise, explained below, a functional exercise involves fewer participants.

Examples of Actions Taken

Clarendon County, SC, reported participating in various tabletop, functional, and full-scale exercises periodically to test and evaluate its plans. The County's EOP was recently reviewed by the South Carolina Emergency Management Division and found to be in compliance with current emergency management doctrine and principles.

Full-Scale Exercises

Full-scale exercises (FSEs) are typically the most complex and resource-intensive type of exercise. They often involve multiple

agencies, organizations, businesses, non-profits, and jurisdictions and validate many facets of preparedness. FSEs often include

many players operating under cooperative systems such as the Incident Command System or Unified Command.

AFTER ACTION REPORTS AND IMPROVEMENT PLANS

Emergency plans (EAPs and EOPs) for a dam should be evaluated after an exercise to either validate their efficiency and effectiveness or to identify necessary revisions. Following an exercise, data collected from facilitators, evaluators, exercise support staff, and players are synthesized into an after action report (AAR) to identify strengths and areas for improvement within the context of the exercise objectives. The AAR focuses on performance standards and enables both the technical and emergency management personnel to verify and validate the information and procedures contained in the plans. The intent is to discover what happened, why it happened, what strengths in the plan should be sustained, and what areas need improvement. The after action process affords the team members an opportunity to gain maximum benefit from an event or exercise. It provides:

- Candid insights into specific strengths and weaknesses from various perspectives
- Feedback and insight critical to improved performance
- Details on exercise specifics that might be lacking in an evaluation report alone

- Evidence to support improved policies, procedures, protocols, training, or other key document changes



The information presented in the AAR can also be used as a historical reference for all participants and a possible blueprint for future training/exercise initiatives.

Serving as a key element of the AAR, the improvement plan (IP) is designed to take those identified areas for improvement and expand on them to potentially include, among other things, focus areas (e.g., policy/protocol/ training, interagency coordination), recommendations for improvement, office(s) responsible for implementing the recommendations, and the expected suspense date/ timeframe for implementing the recommendations.

DAM SAFETY-RELATED TRAINING



The people involved in the implementation of the EAP and EOP should receive periodic training to ensure they are thoroughly familiar with all elements of the plan, the available equipment, and their responsibilities and duties under the plan. Appropriate personnel should be trained in the incident management process, including detection, evaluation, notification, and

appropriate response actions during all emergency level determinations. A sufficient number of people should be trained to ensure adequate coverage at all times. A brief description of the training performed at the dam and how often it is conducted should be included in the EAP. Local emergency management authorities may want to consider developing evacuation and shelter-in-place (if applicable or required) training materials for people who would be affected by a dam failure in their jurisdiction. This is particularly important

when a dam is categorized as unsafe or the population immediately downstream of a dam would be inundated within a short time frame.

Dam safety-related awareness training on EAPs, EOPs, emergency operations, communications, planning, exercises, inundation, and evacuation maps, among other topics, can be beneficial and should be considered for dam owners, operators, emergency managers, community officials, or other stakeholders as needed.

REFERENCES AND RESOURCES

References

DHS (Department of Homeland Security). 2013. *Homeland Security Exercise and Evaluation Program (HSEEP)*.

U.S. Department of Homeland Security. <https://www.fema.gov/media-library/assets/documents/32326>

FEMA (Federal Emergency Management Agency). 2013. *Federal Guidelines for Emergency Action Planning for Dams*.

FEMA P-64. <https://www.fema.gov/media-library/assets/documents/3357>

FEMA. 2010. *Developing and Maintaining Emergency Operations Plans, Comprehensive Preparedness Guide (CPG) 101*.

https://www.fema.gov/pdf/about/divisions/npd/CPG_101_V2.pdf

Resources

FEMA. 2015. *FEMA Mitigation Dam Task Force Strategic White Paper on Dam Risk (DR-SC-4241)*. <https://www.fema.gov/media-library/assets/documents/112356>

National Institute of Standards and Technology. 2006. *Guide to Test, Training, and Exercise Programs for IT Plans and Capabilities*. Special Publication 800-84.

<https://csrc.nist.gov/publications/detail/sp/800-84/final>

Useful Websites

Association of State Dam Safety Officials: <https://damsafety.org>

North Carolina Dam Safety Program: <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permits/dam-safety>

North Carolina Department of Public Safety, Emergency Management: <https://www.ncdps.gov/our-organization/emergency-management>

South Carolina Dam Safety Program: <http://www.scdhec.gov/Environment/WaterQuality/DamsReservoirs/DamsOverview>

South Carolina Emergency Management Division: <http://www.scemd.org>

Exercises

Disaster Response: Incident Command System (ICS): <https://www.fema.gov/incident-command-system-resources> Exercises for business: <https://www.ready.gov/business/testing/exercises>

FEMA Community Emergency Response Team Drills and Exercises: https://www.fema.gov/media-library-data/20130726-1917-25045-3119/cert_functionals_combined.pdf

FEMA Emergency Management Institute Course IS-120.c – An Introduction to Exercises: <https://emilms.fema.gov/IS0120c/curriculum/1.html>

FEMA Emergency Planning Exercises: <https://www.fema.gov/emergency-planning-exercises> Preparedness and Training: National Incident Management System (NIMS): <https://www.fema.gov/national-incident-management-system>

Other Fact Sheets in this Dam Safety Series

Fact Sheet 1: Use of Emerging Technologies

Fact Sheet 2: Notification Methods

Fact Sheet 4: Proactive Actions

Fact Sheet 5: Benefits of Post-Event Data Collection for Dams

The National Dam Safety Program is a partnership of the states, federal agencies, and other stakeholders that encourages and promotes the establishment and maintenance of effective federal and state dam safety programs to reduce the risks to human life, property, and the environment from dam-related hazards.

Visit the National Dam Safety Program website at <https://www.fema.gov/national-dam-safety-program> or scan this QR code.



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