

Emergency Action Plan (EAP) Guidelines

Interagency Committee on Dam Safety (ICODS) Format

The ICODES EAP Guidelines for Dam Owners is recommended for consistency and uniformity. The format also serves as a checklist for completeness. When completed, the EAP will have two sections: the basic EAP and the appendices.

Format and Content

Title Page/Cover Sheet/Table of Contents

- I. Notification Flowchart
- II. Statement of Purpose
- III. Project Description
- IV. Emergency Detection, Evaluation, and Classification
- V. General Responsibilities
 - A. Dam Owner
 - B. Notification
 - C. Evacuation
 - D. Termination and follow-up
 - E. EAP coordination
- VI. Preparedness
- VII. Inundation Maps
- VIII. Appendices
 - Appendix A: Investigation and Analyses of Dam Break Floods
 - Appendix B: Plans for Training, Exercising, Updating, and Posting EAP
 - Appendix C: Site-Specific Concerns
 - Appendix D: Approval of the EAP

TITLE PAGE/COVER SHEET/TABLE OF CONTENTS

The purpose of the title page and cover sheet of an EAP is to identify the document as an EAP and to specify the name of the dam. The table of contents, which will list all the major sections and subsections in the EAP, provides a quick means for locating information.

Section I: NOTIFICATION FLOWCHART

The notification flowchart provides the hierarchy for notification in the event of an emergency. The flowchart must include the following essential information.

- Who notifies whom
- Names, titles, telephone numbers, alternate contacts, and communication mechanisms

The notification flowcharts should be brief, simple, and easy to follow. Notification must flow in both directions and the number of people notified by each individual should be limited. The flowchart should be prominently displayed on the first page of the EAP and also posted as a stand-alone chart. Only one flowchart should be used for emergency (warning) and one for a non-emergency (watch), if possible.

Color-coding is helpful. The individuals and entities that included on the notification flowchart:

- Dam Owner
- Appropriate Federal, State, and Local Agencies
ODNR, Division of Water (614) 265-6731 or (614) 799-9538
- County Sheriff, County Emergency Management Agency
- Residents and property owners downstream of the dam
- Operators of other dams
- Managers of recreational facilities
- National Weather Service (NWS)
- News Media
- Others

Section II: STATEMENT OF PURPOSE

This section defines the purpose and scope of the EAP. (1 or 2 paragraphs)

Section III: PROJECT DESCRIPTION

Must include the following:

- Description and drawing of the dam and appurtenant parts of the dam
- Project location (vicinity map) (State and County)
- Note significant upstream and downstream dams
- Downstream communities potentially affected by a dam failure or flooding as a result of large operational releases
- Any other relevant information

Section IV: EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

- **Detection** of the emergency condition
 - Data and information collection system
 - Process for analyzing data
- **Evaluation** of information
 - Procedures for assessing information
 - Provisions for establishing the severity and magnitude of the emergency
- **Classification** of emergency based on urgency
 - Indicates urgency of the situation
 - Emergency classification chosen and agreed to by dam owner and emergency management dam safety officials
 - Must be relevant to emergency conditions

Potential failure situation is developing (Non-Emergency Watch)

Situations where failure may occur, but preplanned actions may prevent or mitigate failure
Assess situation and put agencies on alert:

- Give urgency condition
- Provide periodic updates
- Agencies decide their own course of action
- As situation worsens, provide a smooth transition from Non-Emergency Watch to Emergency Warning

Failure is imminent or has occurred (Emergency Warning)

Issued when no time is available to attempt corrective measures.

- How much time from imminent to failure:
 - Impossible to determine, but very short!
 - Assume that failure is imminent and failure has occurred are essentially the same condition

Section V: GENERAL RESPONSIBILITIES

The General Responsibilities section of the EAP is:

- Dam owner responsibilities
- Responsibility for notification
- Responsibility for evacuation
- Responsibility for duration, termination, security, and follow-up
- EAP coordinator responsibility

Dam Owner Responsibilities

The responsibilities of the dam owner must be clearly and specifically defined. The following responsibilities should be delineated:

- The decision-making process, including the selection of the appropriate emergency condition
- Specific actions to be taken
- Who will take the actions
- Internal (at the dam) and external (off-site) notification activities

This section should provide guidance on communicating the emergency situation to others and should spell out the chain of command and specific emergency actions.

Responsibility for Notification

Clearly identify the dam owner personnel authorized to notify local officials. The most important elements of this section are:

- Specificity
- Delegation of responsibility and authority

- Timely notification
- Procedures for notifying agencies such as the National Weather Service
- Procedures for notifying media
- Sample messages

Responsibility for Evacuation

Agencies with a statutory obligation are responsible for evacuation. The dam owner:

- Should **not** assume agency responsibility
- **Should** coordinate with appropriate officials

This section of the EAP should specify coordinated and agreed-to evacuation responsibilities of the dam owner, if any. Inundation maps help the evacuation effort.

Responsibility for Duration, Security, Termination, and Follow-Up

- The dam owner and dam personnel must monitor the emergency situation at the dam and keep the authorities informed of developing conditions.
- The dam owner must specify security measures at the dam during the emergency.
- Officials and agencies are responsible for terminating emergency status in affected areas.
- The dam owner terminates the emergency of the dam.
- There should be a follow-up evaluation by the participants involved in the emergency.

EAP Coordinator Responsibility

The following are responsibilities of the EAP coordinator:

- Revised EAP
- Establishes training seminars
- Coordinated EAP exercises
- Serves as the EAP contact for:
 - emergencies
 - Non-emergencies

Section VI: PREPAREDNESS

There are two primary objectives to this section of the EAP: to describe preplanned and emergency actions and to specify emergency measures. The rationale for the first objective of this section is to describe preplanned and emergency actions. This may:

- Prevent a failure from developing
- If possible, minimize loss of life and property damage
- Issue timely warning, and facilitate operation of the dam

The seven areas that must be considered in the development of the section on emergency measures are:

- Surveillance
- Response during darkness
- Access to site
- Response during weekends and holidays
- Response during adverse weather
- Alternate means of communication
- Emergency supplies and resources

Surveillance

- Provisions for prompt detection and evacuation
- Instrumental and/or physical inspections
- Unattended dams (not continuously attended 24 hours a day)
 - Surveillance procedures and systems, such as remote detection systems
 - Instrumental, telemetry, audible alarms
 - Headwater/tail water detectors
 - Coordination of special procedures with local authorities

Response During Darkness

- Actions to illuminate the dam to facilitate gate and other operations
- Operation of equipment during power failure
- Procedures for notifying officials
- Impact on expected response times
- Non-business hours
- Other instructions

Access to Site

- Primary and secondary routes
- Means for reaching the site under various conditions (e.g. foot, boat, car, ATV)
- Expected travel times
- Special instructions

Response During Weekends and Holidays

- Planned actions based on the dam operator's schedule
- Special instructions

Response During Adverse Weather

- Actions to be taken for different conditions, including when the dam will not be attended
- Methods of access
- Expected response time
- Special instructions

Alternate Means of Communication

- Availability and use of alternative systems
- Alternative channels

- Proper procedures
- Special instructions

Emergency Supplies and Resources

- The stockpiling of materials and equipment
- Coordination of information on flood flows
 - National Weather Service, dam owners (up and downstream)
 - Actions to lower the reservoir (i.e., reduce inflow and increase outflow)
 - Who, when, and how to take action
 - Provisions of alternative sources of power, including location, mode of operation, and transportation
 - Site-specific actions

Section VII: INUNDATION MAPS

The inundation maps are of extreme importance in the development of the notification flowchart.

The following are considerations in the development of the inundation maps for the EAP:

- The inundation maps are the responsibility of the dam owner to have completed. An engineer is usually required.
- The development of the maps must be coordinated with relevant agencies.
 - Maps must provide information required by the agencies because the agencies will depend on the maps for evacuation
- The maps must be usable and of appropriate scale. They must be clear and not cluttered with extraneous information.
- The maps must identify antecedent flow conditions:
 - Inflow design flood
 - Color should be used for different scenarios.
- Probable Maximum Flood (PMF) flows as related to the classification of the dam (25%, 50%, 100%) and dam failures.
 - Color should be used for different scenarios.
- The maps must show peak discharge, maximum flood elevation, and travel time.
- An index should be used if the map covers several pages.
- Existing field conditions should be shown on the base map.
- The accuracy and limitation of the maps should be described.
- The maps should be supplemented with a narrative description of the areas affected by the dam break, with surface profiles, and with a characteristic of the failure condition assumed in the preparation of the inundation maps.

Section VIII: APPENDICES

There are four appendices to be developed for the EAP:

- Appendix A: Investigation and Analyses of Dam Break Floods
- Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP
- Appendix C: Site-Specific Concerns
- Appendix D: Approval of the EAP

Appendix A: Investigation and Analysis of Dam Break Floods

- Methodology
- Prevailing stream flow conditions
- Breach assumptions
- Termination of downstream routing

Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP

Training

- Training plan and schedule, with provisions for annual training
- Familiarity with EAP
- Problem detection and evaluation

Exercising

- Exercising plan and schedule, with provisions for annual drills
- Tabletop and functional exercises
- Test remote sensing equipment
- Evaluation of exercises
- Follow-up on recommendation

The follow-up training course focuses on exercising the EAP.

Updating

- Process for revisions
 - Annual review
 - Updating for personnel changes
 - Exercise lessons learned
- Distribution of updated plans

Posting the EAP

- Posting must be up-to-date
- Place EAP in prominent locations
- Post copies of complete and up-to-date EAP in a location near the posted flowcharts

Appendix C: Site-Specific Concerns

- Site-Specific concerns that affect the EAP
- A Glossary, if needed

Appendix D: Approval of the EAP

- Must be signed by all parties
- Indicates the approval and acceptance of responsibilities
- Helps ensure that all parties understand the EAP and their roles and responsibilities