Planning for Failure: The Necessity of Dam Failure Exercises

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Some Dam Statistics

- 13,991 high hazard dams in US (2012)
- Average dam age: 52 years; by 2020 70% of dams will be 50+ years
- 66% of high hazard dams have an EAP
- 69% of dams are privately owned
- The US averages 207 dams per dam safety inspector
- Across the country $57B is needed for dam rehabilitation
- An estimated 4,000 dams are considered deficient (2,000 high hazard dams)
Recent Dam Failure Events
Recent Dam Failure Events
Content Overview

Plan

Where do we go from here?

Findings & Impressions

EAP Exercise Experience

Plan maintenance and review

Opportunities for improvement
Emergency Action Plans require:

- All high hazard dams should have an EAP
- Annual review of contacts
- Update of inaccurate information
- Exercise at least every 5 years
Exercise Experiences

✓ Recreation area
✓ Owned by: Natural Resources District
✓ Constructed: 1985
✓ Population at risk: 1,565
✓ Exercise history: None
Exercise Experiences

- Dam type: Earthen dam
- Owner: Natural Resources District
- Constructed: 1970
- Population at risk: 225
- Exercise history: None
Exercise Experiences

- Dam type: Earthen agricultural dam
- Owned by Natural Resources District
- Constructed: 1961 (Rehabilitated 2011)
- Population at risk: 141
- Exercise history: None
Findings & Impressions: Templated Plans

Positives:
• Everybody can have a plan
• Plans are consistent throughout an area
• Easier review process for regulatory agency
• Relatively inexpensive to develop

Negatives:
• Everybody has the same plan
• Plan owners less likely to adapt the plan
• Often developed without collaboration with critical stakeholders
Findings & Impressions: Communication Gaps

- Engineers and First Responders speak a different language
- EAPs are not developed to be compliant with the Incident Command System (ICS)
- EAPs make assumptions that could be inaccurate
- Local response mechanisms vary from community to community
Findings & Impressions: Staff Trainings

- Varied levels of sophistication for dam observers
- Dam observers may not know what to look for
- Dam owners and staff are often unaware of the complexity of emergency response
- Dam owners and staff may not understand how they fit in the hierarchy of event response
Findings & Impressions: Risk Awareness Communication

✓ The people you hope are reading your EAPs probably are not
✓ Local officials may not grasp the vulnerability the dam presents to their community
✓ Residents in the inundation area may not even know there is a dam upstream
✓ Emergency messages included in the EAP may not be sufficient
Relationship building: IF YOU ARE EXCHANGING BUSINESS CARDS AT AN EMERGENCY EVENT YOU HAVE WAITED TOO LONG!

Identifies gaps in preparedness

Provides insight regarding response complexity
Opportunities for Improvement

- 5-year exercise cycle is not sufficient
- EAPs (and other emergency response plans) should begin with a planning workshop
- Plan templates can be used, BUT should be revised to reflect local dynamics
- Dam owners should explore staff training alternatives
- Dam owners should participate in emergency exercises (dam failure or other)
Critical Components for Success

✓ Know the structure you are addressing
✓ Make sure you have the right people in the room
✓ Encourage discussion, but keep it germane
✓ Identify core capabilities and goals for the exercise
✓ Provide lunch
Moving Beyond Response

- EAPs very focused on event response
- Consider adding preparedness
- Think about how you are communicating risk to stakeholders
- Start to transition from Emergency Action Plans to Emergency Preparedness Plans
Consider moving from EAP to EPP

**EPP overview:**

- Stakeholder meetings
- Risk Awareness Communication Plan
- Emergency Response Component
- Flood warnings and action triggers
- Evacuation planning
- Training protocols
- Exercise the plan
“We’re almost free, everyone! ... I just felt the first drop of rain.”
Can I clarify my message?