Water Supply and Dam Safety

“Working Together for Safer Dams and Increased Water Supply”

Presentation to the Water Supply Workshop
2 June 2009, Tulsa, Oklahoma
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Agenda

• Program and Safety Environment
• Initiatives Integrated with Water Supply
  – Risk Management
  – Decision Making
  – Process
  – Competencies
  – Management
  – Policies
Current Safety Environment: State of Corps Infrastructure

- Portfolio Stats:
  - Very Large
  - Aging (+50 years)
  - Relatively untested

650 Dams

Infrastructure follows Floods, People Follow Infrastructure

2,000 Levees
USACE Structures with Carbonate and Glacial Soil Regions
DSAC Ratings Indicated (268 of 608 Structures)

Legend

- USACE Structures with DSAC Ratings
- 10 mile Buffer of Carbonate Regions
- Carbonate Regions
- Southern Extent of Glacial Soils

Data for Carbonate Regions Adopted from the following USGS Publication:
Digital Engineering Aspects of Karst Map:
National Atlas of the United States of America, Scale 1:7,500,000, By B.D. Tobin and D.J. Weary
Corps of Engineers Dams

- Program Findings 4 Years into Risk Informed Process:
  - Half of Portfolio is Actionable for Rehab
  - Potential Requirement Exceeds $20B in Rehab
    - Currently $500M/year Construction (9 Dams)
    - Engineering Requirement Exceeds $65M/year (60 Dams)
# Comprehensive Risk Framework

<table>
<thead>
<tr>
<th>Category</th>
<th>Risks</th>
</tr>
</thead>
</table>
| Operations             | • Routine Risks  
                          • Emergency Risks  
                          • Operations & Maintenance                                         |
| Engineering & Construction | • Technical Risks  
                                • Risk Reduction Options  
                                • Portfolio Risks                                                   |
| Programs & Project Management | • Schedule Risks  
                                      • Cost Risks  
                                      • Stakeholder Risks                                                  |
Management Initiatives: Principles of Decision Making

<table>
<thead>
<tr>
<th>Old Approach</th>
<th>New Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locally Led</td>
<td>Nationally Led</td>
</tr>
<tr>
<td>Locally Decided</td>
<td>Jointly Decided</td>
</tr>
<tr>
<td>Balance Safety with Other Benefits</td>
<td>Safety Paramount</td>
</tr>
<tr>
<td>First Come, First …</td>
<td>Risk Informed</td>
</tr>
<tr>
<td>Politics Drive Decisions</td>
<td>Politics Supports Decisions</td>
</tr>
<tr>
<td>Every District for Themselves</td>
<td>Cooperation Key to Survival</td>
</tr>
</tbody>
</table>

BUILDING STRONG™
Risk Management Process

- Routine Activities are **Decentrally** Managed
- Non-Routine Activities are **Centrally** Managed:
  - Priorities
  - Queues
  - Staging
  - Investments
<table>
<thead>
<tr>
<th>Dam Safety Action Class</th>
<th>Characteristics of this class</th>
<th>Actions for dams in this class</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>CRITICALLY NEAR FAILURE</td>
<td>Take immediate action to avoid failure.</td>
</tr>
<tr>
<td>URGENT AND COMPELLING</td>
<td>Progression toward failure is confirmed to be taking place under normal operations. Almost certain to fail under normal operations from immediately to within a few years without intervention. OR EXTREMELY HIGH RISK Combination of life or economic consequences with probability of failure is extremely high.</td>
<td>Validate classification through an external peer review. Implement interim risk reduction measures, including operational restrictions, and ensure that emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite investigations to support justification for remediation using all resources and funding necessary. Initiate intensive management and situation reports.</td>
</tr>
<tr>
<td>(Unsafe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>FAILURE INITIATION FORESEEN</td>
<td>Implement interim risk reduction measures, including operational restrictions as justified, and ensure that emergency action plan is current, and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite confirmation of classification. Give very high priority for investigations to support justification for remediation.</td>
</tr>
<tr>
<td>URGENT</td>
<td>For confirmed (unsafe) or unconfirmed (potentially unsafe) dam safety issues. Failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety. OR VERY HIGH RISK The combination of life or economic consequences with probability of failure is very high.</td>
<td></td>
</tr>
<tr>
<td>(Unsafe or Potentially Unsafe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>SIGNIFICANTLY INADEQUATE</td>
<td>Implement interim risk reduction measures, including operational restrictions as justified, and ensure that emergency action plan is current, and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Prioritize for investigations to support justification for remediation considering consequences and other factors.</td>
</tr>
<tr>
<td>HIGH PRIORITY</td>
<td>OR MODERATE TO HIGH RISK</td>
<td></td>
</tr>
<tr>
<td>(Conditional Unsafe)</td>
<td>For confirmed and unconfirmed dam safety issues, the combination of life or economic consequences with probability of failure is moderate to high.</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>INADEQUATE WITH LOW RISK</td>
<td>Conduct elevated monitoring and evaluation. Give normal priority to investigations to validate classification, but no plan for risk reduction measures at this time.</td>
</tr>
<tr>
<td>PRIORITY</td>
<td>For confirmed and unconfirmed dam safety issues, the combination of life or economic consequences with probability of failure is low and may not meet all essential USACE guidelines.</td>
<td></td>
</tr>
<tr>
<td>(Marginally Safe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>ADEQUATELY SAFE</td>
<td>Continue routine dam safety activities, normal operation, and maintenance.</td>
</tr>
<tr>
<td>NORMAL</td>
<td>Dam is considered safe, meeting all essential USACE guidelines with no unconfirmed dam safety issues. AND RESIDUAL RISK IS CONSIDERED TOLERABLE.</td>
<td></td>
</tr>
<tr>
<td>(Safe)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*At any time for specific events a dam, from any action class, can become an emergency requiring activation of the emergency plan.*
Competency Initiatives

- New Risk Management Center:
  - FOA under IWR
  - On-Site & Virtual Staff (25)
- National Cadres
  - Part-time, Voluntary (75+)
  - Full-time, Competitive (10)
  - Strategic Over-hires with Districts (10)
- Production Centers
  - Mapping, Modeling, and Consequence Estimation
Management Initiatives

• Leverage PPM Competencies:
  – More Rigor in Dam Safety Studies:
    • P2 Templates
    • PMPs
    • Trained PMs
  – Project Risks
  – Include Dam Safety in Project Review Boards
Roles & Responsibilities: Public Safety Decisions

- Commanders:
  - Ultimately Responsible
  - Appoint Safety Officers w/higher HQ Safety Officer Concurrence

- Dam Safety Officers:
  - Make Safety Case First (1)

- DDPMs and PMs:
  - Consider all other aspects: Additional Safety, Political, Economic, Societal, and Cultural Benefits (2)
Policy Initiatives

- **Assessment:**
  - How Safe is Safe?
  - Priority & Urgency
  - What is Tolerable?
- **Management:**
  - Effectiveness of Interim Measures?
  - What Options are Available?
  - What is Practicable?
  - How Well Justified is Action?
- **Communication:**
  - How reliable is it?
  - What is Societal Risks?
  - What Risks Remain?

Tolerable Risk Guidelines
Policy Initiatives

• Reallocations
  – Limits Water Supply Studies to Safe Dams
    • DSAC IV and V Dams
  – Protects Potential stake holders from Rehab Costs

• IEPR and SARs
  – Virtually All DSAC I, II, and III Dams in Queue
Questions?

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