National Hydropower Association
Hydraulic Power Committee
2007 Fall Meeting
Duluth, Minnesota

FERC UPDATE

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FERC UPDATE

- Ongoing Initiatives and Projects
- Engineering Guidelines
- Recent and New Initiatives

Ongoing Initiatives and Projects

- Potential Failure Mode Analyses (PFMA)
- Surveillance and Monitoring Plans
- Pumped Storage Technical Guidance Task Group
- Significant and Low Hazard PFMA's

Potential Failure Mode Analysis

- FERC's PFMA Process Implementation Began in 2003
- All Projects Subject to a Part 12D Inspection Will Have Had a PFMA Completed By The End Of 2008
- Remaining PFMA's by RO's

  SFRO 4
  NYRO 3
  PRO 6
  CRO 15
  ARO 2

Surveillance and Monitoring Plans

- Reason for SMP Guideline

Overall Collection of Data Superb. However….

  - Inadequate or No Evaluation of Instrumentation Data
  - Instrumentation Details Often Not Provided
  - Instrumentation Program Not Well Thought Out

Surveillance and Monitoring Plans

- Comment Period Closed. Final Version Under Review
- Received 20 Comments on Draft Version
- Comments
  - SMP to Detailed
  - Data Should Only Be Submitted as a PDF File
  - We should not have to submit qualifications of observers.

Pumped Storage Technical Guidance Task Group

- Review of All FERC Pumped Storage Projects Following Taum Sauk
- November 2006 Workshop With All Owners, Consultants, Federal and State Agencies
- Owners Endorsed the Need for a Guidance Document

Pumped Storage Technical Guidance Task Group

- Industry Led Task Group is developing Safety Guidance
- Held First Meeting – February 2007
- Development of guidance document underway

Peer Review of FERC Dam Safety Program Follow Up Actions

- Operation Inspection Reports Title Changed to

"Dam Safety Inspection Report"

Peer Review of FERC Dam Safety Program

Finding – We Don't Have Enough Experienced Staff

Recommendations

- Get More Experience Engineers
- Intensive Training to New Engineers on "Dam Safety" Engineering

Training Opportunities

- **USSD Workshop**
  Dam Safety Surveillance and Monitoring Workshop
  Atlanta, GA
  October 30 – 31, 2007

- **FEMA Dam Safety Technical Seminar**
  Case Studies
  Emittsburg, MD
  Week of February 19, 2008

- **USSD**
  "The Sustainability of Experience – Investing in the Human Factor"
  Portland, Oregon
  April 28, 2008

Peer Review of FERC Dam Safety Program

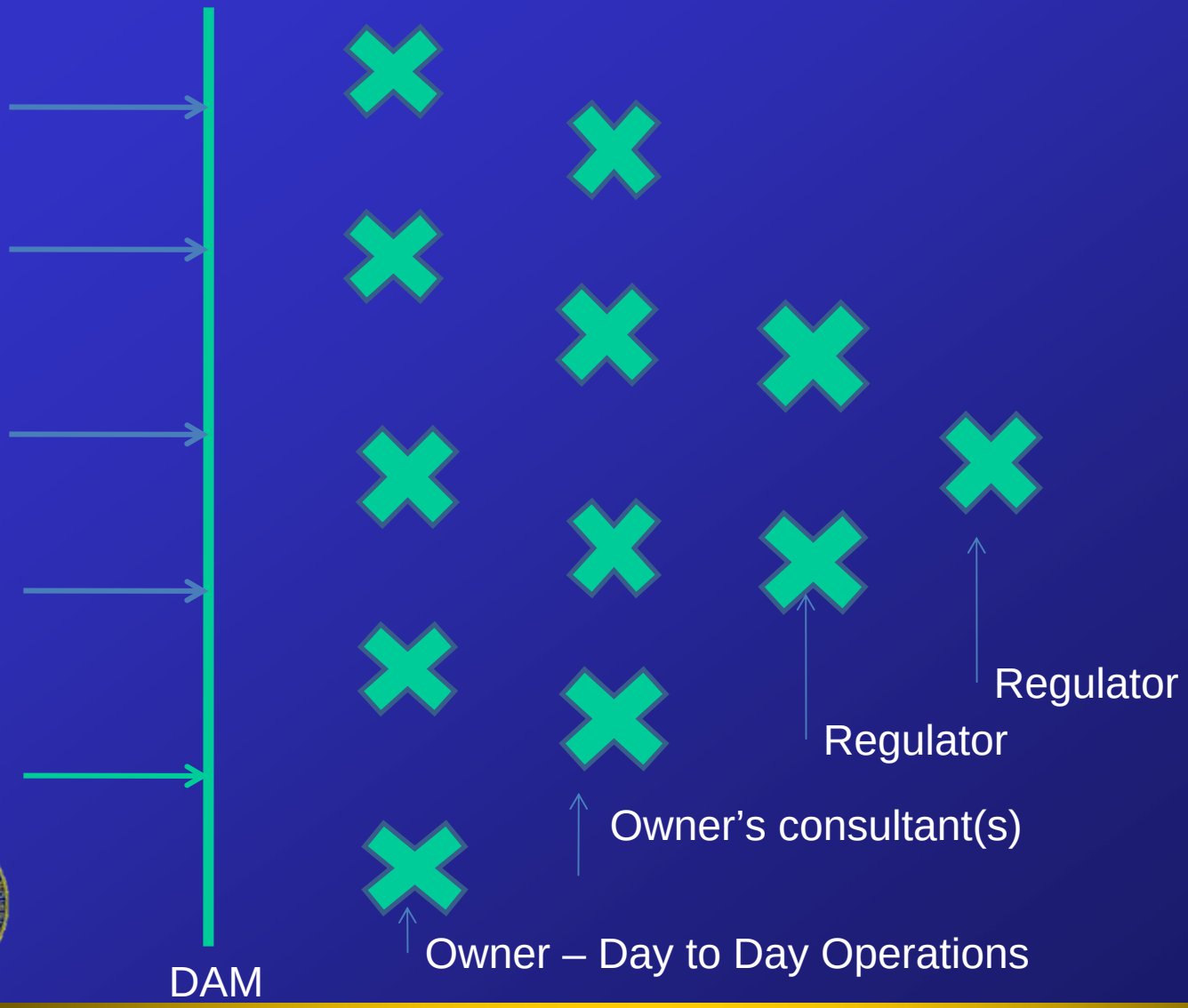
Finding – Owners do not Feel They are Responsible for Dam Safety, Rather Defer to FERC to Define and Maintain Safe Dams.

Recommendations

- Require an Owner's Dam Safety Program With the Responsibility and Authority to Maintain Safe Dams

- Emphasize That the Owners – Not FERC – Are first and Foremost Responsible for Dam Safety

Football and Dam Safety



Owners Dam Safety Programs (ODSP)

- ODSP significant factor in major dam failures
- Problems ranged from communication failures to negligence
- Taum Sauk is a wake up call for dam safety community
- Peer review found some owners deferring responsibility
- FERC Dam Safety Program may be encouraging this deference

Owners Dam Safety Programs (ODSP)

- During This Year's Dam Safety Inspection We Will Be Reviewing Your Dam Safety Program
- Letter announcing this years Dam Safety Inspection will have a self evaluation form.
- No One-Size Fits All. Two Fundamental Categories Will be assessed

Owners Dam Safety Programs (ODSP)

1. Technical Requirement

   - Technical Expertise of Responsible Personnel
   - SMP
   - Emergency Preparedness
   - Ongoing Maintenance
   - Remediation of Dam Safety – Deficiencies or Vulnerabilities

Owners Dam Safety Programs (ODSP)

2 Organizational Practices

- Recognition of Responsibilities for Dam Safety Communication
- Allocation of Resources to Dam Safety
- Learning Organization
- Clear Designation of Responsibility

Engineering Guidelines

- Peer Review Process
- Chapters Under Revision
- New Chapters

Peer Review Process

- Chapter 14 PFMA Model
- Identify Needed Guidance or Revisions
- Convene Task Group of FERC/Owners/Consultants
- Develop Guidance
- Industry Wide Peer Review
- Finalize Guideline

Engineering Guidelines – Chapters Under Revision

- 2 – Selecting and Accommodating Inflow Design Floods for Dams
- 4 – Embankment Dams
- 6 – Emergency Action Plans
- 9 – Instrumentation and Monitoring
- 14 – Dam Safety Performance Monitoring Program

Chapter 2 – Selecting and Accommodating Inflow Design Floods for Dams

- Clarify Chapter 2 by changing the focus from the Design Flood to an incremental Impact Assessment
- Introduce the concept of Incremental Impact Assessments
- Clarify use of the "2 ft increment" as a decision making point

Chapter 4 – Embankment Dams

- Static Analysis is Posted on the FERC Website for Comment

http://www.ferc.gov/industries/hydropower/safety/guidelines

- Provides useful information on the historical causes of failures and near failures of embankment dams
- Further revisions are underway to include the state of practice in analyzing dams subject to liquefaction
- Intent is to develop a national guideline similar to how the Earthquake Ground Motion Chapter 13 is being developed

Chapter 6 – Emergency Action Plans

- Add New Section Giving Schedules for all EAP Submittals and Exercises
- Revise Sections on Exercises. Clarify What is Expected for each Exercise
- Provide New Guidelines for Inundation Maps

Chapter 6 (cont.) – New Guidelines for Inundation Maps

- Recommended Inundation Maps Created using GIS Technology. (Benefits to EMAs, Makes Updating Maps Easier, Helps Estimate Populations-at-Risk, etc.)
- Inundation Zone Files Should be Submitted to FERC for our GIS
- We Will Start Asking for Plans and Schedules After we Issue New Guidelines
- Submittals can be Staggered Depending on:
    1. If maps are already in GIS format
    2. If EMAs can use the files
    3. The level of downstream impacts

Engineering Guidelines – New Chapters

- Chapter 13 – Evaluation of Seismic Hazards (Draft Version)
- Fuse Plugs – Appendix to Chapter 2
- Water Conveyances

Chapter 13 – Evaluation of Earthquake Ground Motions (draft)

- Draft chapter is posted on the FERC website for comment

http://www.ferc.gov/industries/hydropower/safety/guidelines

- Chapter reviews the information needed for estimating earthquake ground motions and summarizes the most relevant available procedures for estimating these parameters

- Reviews both the quasi-deterministic and probabilistic seismic hazard evaluation

Chapter 13 – Evaluation of Earthquake Ground Motions (draft)

- Examples problems using both the probabilistic deterministic approach
- Chapter was the subject of the USSD March 8th Workshop
- Targeting completion Spring 2008

New Guideline – Fuse Plugs

- Design Considerations
  Hydrology and Hydraulics
  Geotechnical
- Appropriate Uses
- Operation and Maintenance Issues
- Draft Will be Posted on the FERC Website Shortly for comment

New Guideline – Water Conveyances

- Penstocks, Canals, Flumes, Tunnels
- For each conveyance type
  - Description of Typical Features
  - Potential Failure Modes
  - Possible Defensive Measures
  - Recommendations for Surveillance and Monitoring

Recent and New Initiatives

- Risk Assessment
- Regional Coordination
  Federal and Non-Federal Technical Dam Safety Issues
  Regional Technical and Management Workshop
- Owner's Dam Safety Programs
- Significant and Low Hazard PFMA's

Risk Assessment

- The FERC recognizes the value risk assessment brings to dam safety
- The FERC is exploring how Risk Assessment techniques can be best utilized in a regulatory environment
- Staff trained and receptive
- Pilot Risk Assessment of Project
- Inventory Risk Assessment

Regional Coordination

- Makes sense to coordinate and collaborate on technical and management dam safety issues
- Including Federal and Non-Federal dam owners
- NW Regional Workshop – February 2006
- 2nd NW Regional Workshop – September 2006
- 3rd NW Regional Workshop – May 2007
- Southeast- Owners Forum USSD Workshop Atlanta, October 2007

Regional Coordination

- Mid-Columbia Seismic Study
- Owners/Reclamation and USACE

Significant and Low Hazard PFMA's

- Proposed extension of PFMA's to Significant and Low Hazard Dams
- Two Pilot Projects per Region have or will be performed
- Letter to be issued shortly asking for your comments

Low Hazard Dams

- Greater than 9 feet and storage capacity greater Than 25 acre feet
- PFMA performed as part of Dam Safety Inspection
- FERC Engineer will serve as the facilitator or if owners prefers they can take the lead
- Will only look at likely, unlikely probability of failure and not use the 4 categories

Significant Hazard Dams

- Owner takes the lead following guidance in Chapter 14
- Perform the PFMA with own in-house dam safety staff or by retaining a engineering consultant

FERC Hydropower Security

Objective

Dam Owner Should Ensure Reasonable and Appropriate Security Measures are in Place.

- Response Should be Logical and Ideally Should Be Risk-Based as a Function of Threat, Vulnerability and Consequence

FERC Hydropower Security (Continued)

- Evaluate Existing Security to Determine if Protection is Sufficient Based On Risk

  - ✓ Can You Detect an Adversary
  - ✓ Can You Assure the Threat is Real
  - ✓ Can You Delay This Adversary Before Response Force Arrives
  - ✓ Is Response Force Appropriate for the Perceived Threat
  - ✓ Is Your Security System Dependable. Do you Have Varying Response Levels

FERC Hydropower Security
FERC Requirements

- **FERC Security Program for Hydropower Projects Guidance**
  - http://www.ferc.gov/industries/hydropower/safety/guidelines/security/securitytext.pdf
- Requirements are based on your Security Grouping (definitions are in guidance)

FERC Hydropower Security
FERC Requirements

- Security Group 1 Dams
  - Security Assessment
  - Vulnerability Assessment
  - Security Plan
  - Integrate Security Procedures and Emergency (EAP) Procedures

FERC Hydropower Security
FERC Requirements

- Security Group 2 Dams
  - Security Assessment
  - Security Plan
  - Integrate Security Procedures and Emergency (EAP) Procedures

FERC Hydropower Security
FERC Requirements:

- Security Group 3 Dams
  - There Are No Requirements For Security
    (Although a Prudent Owner Will Consider What is Appropriate)

FERC Hydropower Security
FERC Requirements

- Security Group 1 and 2 Dams Will be Inspected Annually

  - ✓ Licensee Must Show All Security Documents to the Inspecting Staff
  - ✓ Licensee Must Have a Knowledgeable Person Available to Discuss Security
    - Discuss Rationale and Assumptions Made in Formulating Security Posture
  - ✓ Licensee Must Provide Data to Fill Out the Security Inspection Form Questions
  - ✓ Provide Input for FERC Staff to Complete a DAMSVR Assessment Of the Project
  - ✓ Address Deficiencies as Based Upon Overall Risk

FERC Hydropower Security
FERC Requirements

- We Will Be Requiring Self-Certification Testing of Security Plans (Drills)
- As an Electric Utility, You May Have Requirements From The North American Electric Reliability Council (NERC), (i.e. CIP Standards) That You Must Adhere to Outside of FERC Dam Safety

Questions ?