National Hydropower Association
Hydraulic Power Committee
April 24, 2013 Meeting
Washington, DC

FERC
Division of Dam Safety and Inspections

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1. Is FERC generally pleased with the Owner's Dam Safety Programs (ODSPs) that have been submitted? Any general comments or recommendations for improving them?

Basic Principles of a Good ODSP

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

Benefits of an ODSP
Regulator Perspective

- An ODSP includes all aspects that affect Dam Safety
  - Organizational plus Technical aspects
- Provide opportunities to discuss Dam Safety needs and improvements within the owners organization, consultants, contractors and with the regulator
- Having a well thought out ODSP clearly reduces the risk of something bad happening at FERC projects

Owner's Dam Safety Program (ODSP)

Positive Comments from Industry

- Helped to Raise the Profile and Visibility of Licensee's Dam Safety Program
- Increased the understanding of Senior Executives on Dam Safety and the Risk they hold as dam owners
- Highlighted the Need to Have Knowledgeable Dam Safety Engineers in the Organization
- Caused Licensees to Seriously Plan For Succession Planning

Owner's Dam Safety Program

- In general, submittals have been high-quality, demonstrating importance that many owners have placed on the effort
- We will provide a generic, best-practices list as enclosure to our review letter to you

Owner's Dam Safety Program (ODSP)

Review Comments

Chief Dam Safety Engineer Responsibilities and Qualifications Not Well Defined

Poor Dam Safety Training Plan

Meeting FERC requirements should not be the primary judgment that a Licensee has a good ODSP

Silent on requirement of CDSE to report to senior management the status of overall inventory of dams and associate dam safety issues on a periodic basis

No backup plan if CDSE is not available to carry out duties

Owner's Dam Safety Program (ODSP)

Review Comments

Some of the Licensees that Submitted Well Written ODSP's Do Not Have The Best Executed Dam Safety Programs

Some of the Licensees That Submitted Poorly Written ODSP's Have Some of the Best Dam Safety Programs

2. Will FERC be requesting dam safety certifications from licensee executives or CEOs?

- **Considering Certification for Continued Operation included as part of DSSMR**
  - Dam owner has ultimate responsibility for the safety of their dams
  - As logical extension of ODSP, dam owner should have no issue certifying their dams are safe
  - Why is dam safe
  - PFM and risk reduction measures
  - Requirement would raise dam safety awareness of upper management
  - Will work with owners on acceptable certification details

3. Please update us regarding the possibility of guideline changes to enhance existing emergency action plans (EAPs).

EAP Enhancement Initiative

Requirement of all high and significant hazard potential dam owners to include in the EAP a more detailed description of your operating plan during high flow events

EAP Enhancement Initiative

Why did FERC begin this initiative?

- During recent storm events FERC received inquiries from several Licensees asking what pre-emptive steps they could undertake to ensure their dams safely passed the expected flood flows. We wanted to ensure that all Licensees are prepared ahead of storm events to avoid unnecessary complications during the events.

- Make sure Licensees have a well thought out operating plan to safely pass flood flows

- Improve communication to reduce post flood event complaints

EAP Enhancement Initiative

Key Aspects Described in EAP

1. Essential operations before, during, and after flood flows reach your project.

2. A general overview tying project discharges to EAP notification procedures.

3. For projects that are remotely operated, describe what triggers sending staff to a project and at what point personnel are to be physically present at a site.

4. If the reservoir is to be drawdown describe coordination you will undertake with the resource agencies.

EAP Enhancement Initiative

Comment from NHA HPC

- Since many licensees already have extensive operating plans, referencing SOPs or O&M manuals in the EAP could achieve most of D2SI's objective, and also avoid internal confusion
  - Response
    - Reference to SOP and O&M manuals ok as long as short overview provided.

EAP Enhancement Initiative

Comment from NHA HPC

- Rather than including the procedures in the EAP, would communicating actual discharges or reporting percent of maximum spill capacity achieve D2SI's objective, which would avoid predicting downstream impacts but create a trigger to notify.
  - Response
    - General targets of when discharges may exceed bank flows and notifications are to be given to emergency responders are to be established in advance and summarized in EAP.

EAP Enhancement Initiative

Comment from NHA HPC

- When D2SI developed the Owners Dam Safety Program last summer you provided an example of an ODSP. Can you provide a similar example of what you are seeking in an EAP amendment?
  - Response
    - See attached

Example High Flow Operation / Notification Table

The following is an example table that correlates outfows from a dam, operation procedures, expected impacts, and the organizations that will be notified.

Flow (cfs)	Operation Procedures	Expected Impacts	Organizations to be Notified
< 2,000	Operate powerhouse turbines from remote command center as needed to maintain water surface elevation of 810 ft.	None	None
2,000 - 10,000	As water levels reach elevation 810.2 ft, open gates as needed from remote command center to return to normal water surface elevation of 810 ft. If flows are predicted to exceed 10,000 cfs, send roving operator to dam.	None	None
10,000 - 12,500	Manually open gates to maintain normal water surface elevation of 810 ft. Remote command center will monitor water levels and notify roving operators for further gate modifications.	Minor riverbank flooding	National Weather Service, Downstream Dam Owner
12,500 - 15,000	Manually open gates to maintain normal water surface elevation of 810 ft. Remote command center will monitor water levels and notify roving operators for further gate modifications.	Flooding of low-lying roads near river	National Weather Service, Downstream Dam Owner, Local Police
15,000- 17,500	Manually open gates to maintain normal water surface elevation of 810 ft. Operators will man dam 24/7.	Significant flooding of roads near river	National Weather Service, Downstream Dam Owner, Local Police
17,500 - 20,000	Manually open gates to maintain normal water surface elevation of 810 ft. Operators will man dam 24/7.	State Highway 92 bridge flooded, significant flooding of local roads and houses near river	National Weather Service, Downstream Dam Owner, Local Police, State Emergency Management Authority
>20,000	Operators will man dam 24/7. Leave all gates open. If water levels approach elevation 812 ft and are continuing to rise, operators will go to high ground and initiate Potential Failure Condition of EAP. If water levels approach elevation 814 ft (crest of embankment), operators will initiate Imminent Failure Condition of EAP.	State Highway 92 bridge flooded, significant flooding of local roads and houses near river upstream and downstream of the dam, possible dam failure	EAP Notification Flowchart

EAP Enhancement Initiative

Comment from NHA HPC

- Is D2SI asking licensees to take on additional responsibility for notifying the public in the event of an emergency?
  - Response
    - No. We are asking Licensees to review their operating procedures to ensure the project can safely pass flood flows and to make sure notifications go out to the emergency responders, National Weather Service and Corps of Engineers/Other Agencies as early as possible. Thus we are asking for Licensees to review their procedures ahead of time to ensure they have a well thought out plan prior to the flood event.

Future EAP Enhancements

- FEMA is expected to issue changes to Federal Guidelines for EAPs this year.
- Some changes to the FERC's suggested EAP format may come from this:
  - Four Emergency Classifications – High Flow, Non-Failure, Potential Failure, Imminent Failure. No More Condition A/B/C.
- We will need to modify our EAP Guidelines before asking for modifications.

4. Please expand upon the nature and purpose of final construction reports. Should they essentially be a concise summary of the previously submitted monthly construction reports?

Final Construction Report

- Evaluate the overall quality of the completed project
- Summarize significant aspects of construction
- Construction sequence
- Major design modifications
- Overall results of QC testing

Final Construction Report - Continued

- Important construction issues and how they were resolved
- If BOC involved, list major item discussed and how they were resolved
- Review potential failure modes

5. Any future changes coming to the hydro security plans as a result of President Obama's February 19, 2013 Executive Order regarding cyber security?

Federal Energy Regulatory Commission
Division of Dam Safety and Inspections

- D2SI does not anticipate any changes to the FERC Security Program for Hydropower Projects with respect to cyber security:
  - We continue to monitor the status of offsite automated (SCADA) control systems for water-retention structures, ensuring that proper procedures are in place to prevent unauthorized use or mis-operation of automated controls.
- We are unaware of potential modifications to the NERC Critical Infrastructure Protection (CIP) Standards, as required by a different FERC Office; however it would not be unreasonable to assume that the Executive Order may impact this program and its requirements.
- We are working with the new FERC Office of Energy Infrastructure Security (OEIS) to monitor their activities. It is possible Licensees may be contacted by the new OEIS for information and “reach-out” opportunities. Licensees should be aware of this new office and that they are distinct from D2SI activities.

6. Will FERC be requesting security certifications from licensee executives or CEOs?

- Certification at this level is not required by the FERC Security Program for Hydropower Projects; however, it is important that Licensee management at this level be aware of the program and of the level of security risk being assumed at their projects.

- Licensees are reminded to consult Section 8.0 (p.34-35) of the FERC Security Program for Hydropower Projects (R2) for the level of detail required for the annual certification. We note that many certification letters do not contain dates of last document updates/reprints/Security Plan exercise.

7. Any new dam safety concerns or initiatives coming to the forefront within the next year?

- Industry is looking at state of practice on Liquefaction Analysis
  - Effort by National Research Council may get traction and move forward.

Structural Design Criteria for New Construction:

- Significant difference between concrete design criteria promulgated by the American Concrete Institute (ACI) and the U.S. Army Corps of Engineers. (USACE)
- For hydraulic structures, USACE requires the ACI load factors to be multiplied by an additional hydraulic modifier of 1.3.
- ACI load factor for fluid is the same as dead load. USACE treats fluid as a live load.

- USACE cover requirements are greater.
- There are also differences between the American Iron and Steel Institute (AISC) design criteria and the USACE.
- The USACE requires a reliability factor to be applied to the AISC resistance values when using LRFD.
- The USACE reduces allowable stresses are reduced when using ASD.

- The USACE has additional corrosion and fatigue requirements.
- It has long been the unofficial practice to use USACE design guidance for concrete structures.
- The USACE design criteria is typically more conservative because of the corrosive potential of water and because of an assumed high consequence of failure.

- Existing reinforced-concrete hydraulic structures designed by the Corps, using the working stress method have held up extremely well. USACE guidance was intended to result in designs equivalent to those resulting when working stress methods were used.

- The FERC is considering officially adopting USACE design criteria for hydraulic structures.

ANY ADDITIONAL QUESTIONS?