



Dam Surveillance and Monitoring

10 years later....

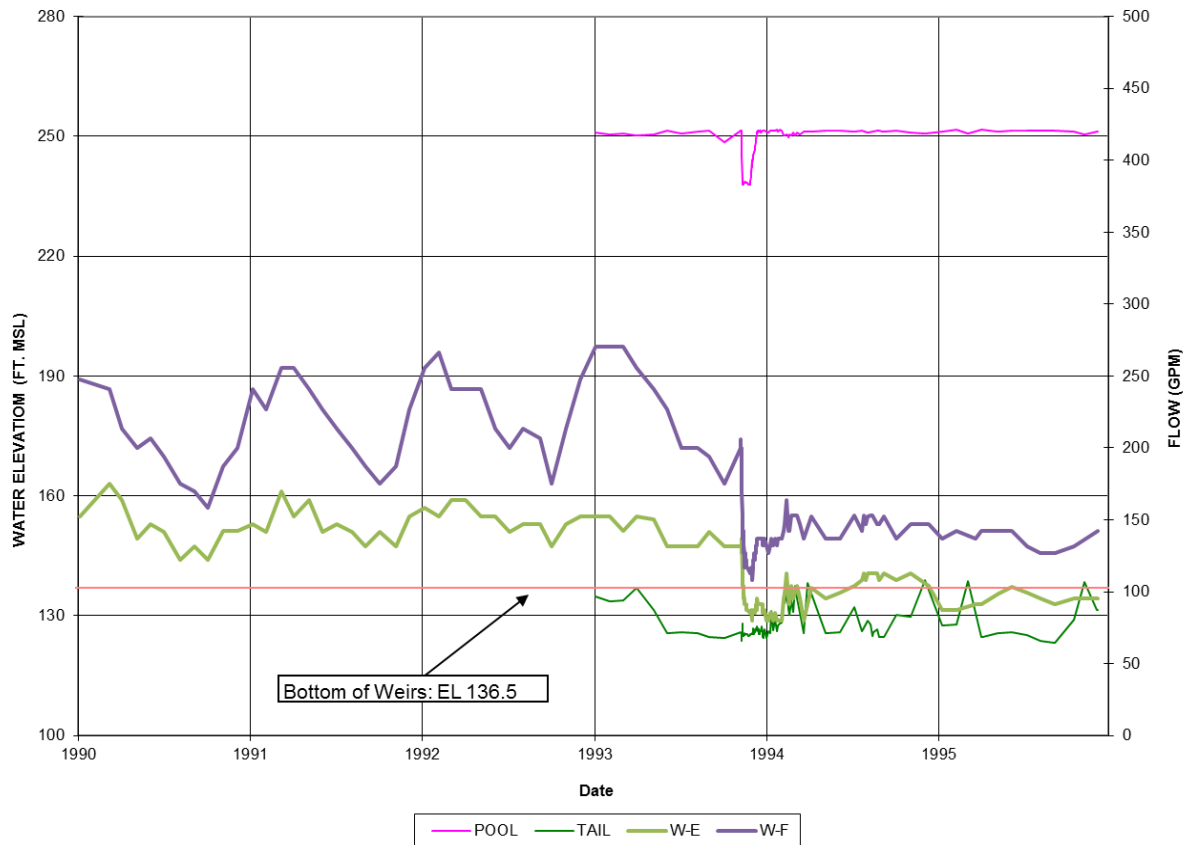


Why a workshop today...

- 2015 - Ten year anniversary of the establishment of the Dam Safety Performance Monitoring Program (DSPMP)/Potential Failure Modes Analysis (PFMA), as published in Chapter 14 of the Engineering Guidelines.
- Where did we start?
- What have we learned?



Where Did We Start... Instrumentation

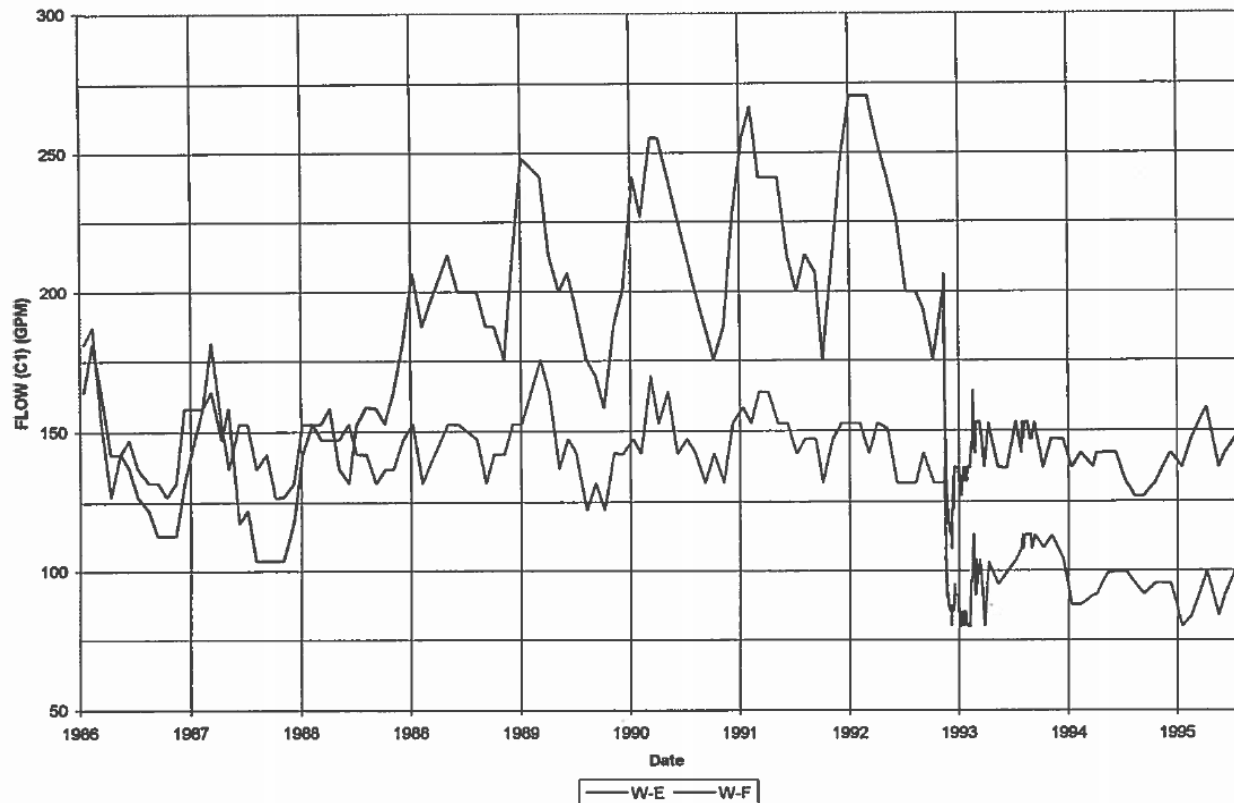




Federal Energy Regulatory Commission Division of Dam Safety and Inspections



Where Did We Start?





Where Did We Start...

Inspection





What have we learned...

- Potential Failure Modes – the evolution

The Devil is in the Details



Step by Step – initiation, progression, failure

Have we forgotten the picture? Draw it

- DSSMP links to Potential Failure Modes
the purpose of each instrument, each inspection
to a PFM
- Discovery of new PFM's through Surveillance & Monitoring



What have we learned...

- Surveillance and Monitoring Program
 - Instruments and Inspections a start
 - Data Evaluation, Interpretation – Understanding?
- How you look often decides what you see
- Lessons on data presentation and evaluation



What have we learned...

- Review Changes to FERC Guidance
Appendix J and K modifications, Ch. 14
- Defining Threshold and Action Levels
- Lessons\Best Practices for DSSMR's
- Lessons learned by licensees – Dam Stories



- Questions from Attendee Survey

1. First, clarification on the semantics associated with the use of Threshold and Action Limits within Chapter 14 is a bit confusing, and could use some clarification. Second, having a good discussion of perspectives on when an instrument is considered general health. It would be nice to share examples of where different licensees have decided that instruments are general health, and their logic behind that decision.



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



2. Is there a preferred methodology for setting action levels?
3. How often should they be reviewed and possibly be adjusted?
4. If an instrument is in a long term downward trend should the actions levels also be adjusted downward?
5. I would like FERC to provide their expectations for a DSSMP for timber crib dams/timber crib-concrete capped dams, with a focus on threshold and action levels.

Should owners focus on settlement, alignment/movement, theoretical stability calculations, depth of voids below concrete cap, leakage: what threshold limits or actions levels should be established for these types of measurements?



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



6. Should PFMs with only reservoir level monitoring be included in the “Instrumentation associated with a PFM” table?
7. Update on the difference between Action Levels and Thresholds, and design limits vs statistics based limits (i.e., calculated maximum deflection vs history of movement/standard deviation
- 8 . Examples and explanations of where some kind or frequency of monitoring wasn’t sufficient to show a failure early enough to be completely avoided;
9. Examples of where the data showed a trending problem, but it was either too subtle or misunderstood to be recognized as early as feasible;



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



10. Examples and Explanations of where the data was clear, but not acted on and some problem developed, or a near miss was avoided;
11. Examples of when monitoring frequency is not appropriate (too often, not often enough.....or correct frequency but collected during a season or time-of-day that obviated a trend);
12. Examples of excellent and not-so-good data presentation; and,
13. Examples of state of the practice versus old-school/obsolete monitoring and/or data presentation methods.
14. How to deal with instrumentation that is failing or has failed. Antique instruments propose special problems



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



15. Assistance in getting a better definition on how to set action level and clarifying steps that should be taken when an action level is exceeded. The terms design basis value, threshold value, and action levels are used in Appendix J. However, the threshold value based on an abnormal reading from historical is usually what prompts an action. Also, sometimes an increasing or decreasing trend while not yet exceeding threshold values could prompt an action. In addition, the threshold values could change throughout time. How can this be better clarified and set in a DSSMP? Furthermore, when annual DSSMRs are to review the data with relation to these values, how can recommendations be made more concretely?



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



16. Provide us a "heads up" and discuss recent and planned changes to the Engineering Guidelines.



Federal Energy Regulatory Commission Division of Dam Safety and Inspections



Dam Safety Monitoring

?



Federal Energy Regulatory Commission Division of Dam Safety and Inspections

