

TABLE 1: SUMMARY OF AD HOC COMMITTEE MEETING NO. 1 COMMENTS

Comment No	Comment	Significance
1	The use of the term "Comprehensive Needs Assessment" implies a more thorough examination of needs than currently proposed via the identified six (6) tasks and may be interpreted by the public as misleading.	Medium/High
2	Proposed criteria by which to evaluate "safety" and "reliability" have not been provided, thus precluding the Ad Hoc Committee from communicating to the public the proposed thresholds between safe/not safe and reliable/not reliable.	Medium
3	Timely public dissemination of select relevant documentation will aid the Ad Hoc Committee to fulfil its role of communicating accurate information and context about the current needs assessment for Oroville Dam and appurtenant structures initiative.	Medium

TABLE 2: LEVEL OF SIGNIFICANCE SUMMARY

Level of Significance	Significance Definition	Take Home Message
High	There is a fundamental issue within the study, documents or data that will influence the technical or scientific basis for development of, justification of, or ability to implement the recommendations.	Obstacles to Future Progress
Medium/High	There is a fundamental issue within the study, documents, or data that has a strong probability of influencing the technical or scientific basis for development of, justification of, or ability to implement the recommendations.	Potential Obstacles to Future Progress
Medium	There is a fundamental issue within the study, documents, or data that has a low probability of influencing the technical or scientific basis for development of, justification of, or ability to implement the recommendations.	Risk(s) not identified or analyzed
Medium/Low	There is missing, incomplete, or inconsistent technical or scientific information that affects clarity, understanding, or completeness of the study, documents, and/or there is uncertainty whether the missing information will affect development of, justification of, or ability to implement the recommendations.	Technical quality of document
Low	There is a minor technical or scientific discrepancy or inconsistency that affects clarity, understanding, or completeness of the study or documents, but does not influence the development of, justification of, or ability to implement the recommendations.	Clarification

Ad Hoc Committee Comment 1

The use of the term “Comprehensive Needs Assessment” implies a more thorough examination of needs than currently proposed via the identified six (6) tasks and may be interpreted by the public as misleading.

Basis for Comment

The Department of Water Resources refers to this effort as an initiative that will “bolster the safety and reliability of Oroville Dam and the appurtenant structures (Knittweis 2018).” The effort identified six evaluation tasks:

Task 1 – Alternatives Evaluation to Restore Spillway Design Capacity to Pass the Probable Maximum Flood

Task 2 – Operations Needs Assessment to Support Development of Alternatives Reservoir Outflow Enhancements

Task 3 – Flood Control Outlet Enhanced Reliability

Task 4 – Alternatives Evaluation for Low-level Outlet

Task 5 – Oroville Dam Embankment Reliability and Improvements

Task 6 – Instrumentation and Monitoring for the Oroville Dam Complex

While these evaluations do address both safety and reliability aspects of Oroville Dam, they are not an exhaustive list, nor do they capture ‘lessons to be learned’ as documented (France et al, 2018) by the Oroville Dam Independent Forensic Team (IFT). Examples that directly address safety and reliability, but are not captured in the identified six tasks include (Capka, 2018):

- develop and maintain mature dam safety management programs;
- shift organizational culture in a direction that reflects more humility and vigilance regarding the risks associated with this infrastructure;
- shift organizational culture in a direction of more humility regarding its expertise and an orientation towards being more of a “learning organization.”
- address the strain in the relationships between some internal groups, especially between the Division of Operations & Maintenance (O&M) and Division of Engineering (DOE)
- CDSE must be in a position to see the tensions between dam safety and production activities and satisfy themselves that the trade-offs between competing objectives are being dealt with properly
- DWR has been faced with very significant bureaucratic constraints with respect to maintaining a size and composition of its technical staff that fits its evolving needs. These constraints have substantially inhibited recruiting and hiring of qualified individuals, promoting staff to senior technical positions, and redirecting or terminating chronically underperforming staff. Additional inhibiting factors have included lack of overtime compensation for senior staff, and use of generic position titles which do not reflect the specialized roles and expertise of technical staff. These constraints have significantly impaired DWR’s ability to develop and maintain organizational technical expertise, control costs, meet schedules, and maintain morale.
- DWR did not have sufficient breadth and depth of expertise to manage the risk associated with its dam portfolio, and should therefore increase its expertise related to dam engineering and safety.
- communication and coordination between DOE and O&M should be improved, including between the DOE Dams and Canals section and the O&M Dam Safety Branch. The Dams and Canals section should learn more about dam safety management, the Dam Safety Branch should draw more on the technical expertise of the Dams and Canals section, and the Dam Safety Branch should continue to develop the technical expertise of its own staff.
- DWR should cultivate development of teams of specialists in various aspects of dam engineering and

safety, supporting them by allocating time and funding for them to learn about and keep up with evolving states of practice. These staff should be provided with compensation and position titles that are commensurate with their specialized expertise. It should be recognized that it is not reasonable or prudent to rely on generalist civil and structural engineers to make engineering judgments and decisions for dams and appurtenant structures which are large, complex, and/or high-risk facilities.

- As an organization, DWR should interact more with the national and international dam engineering and safety communities, in order to learn from others and identify best practices.
- DWR should generally increase the level of the continuing education and training provided to its technical staff involved in dam engineering and safety.
- the dam safety branch (DSB) should have sufficient staff and funding to identify and manage dam safety issues on a proactive basis, rather than merely struggling to keep up with regulatory requirements on a reactive basis.
- DWR should continue with development of its Asset Management Program, with dam safety and risk-informed decision-making incorporated as an integral part of this program. The development of an appropriate prioritization scheme is central to this effort.
- DWR continue to work towards improving its information management, and should aim to develop a state-of-the-practice information management system for its dams and other infrastructure.
- DWR should also contemplate what could improve its approach to dam safety, over and above simple regulatory requirements.

Several of the items referenced above are related to Human and Organizational Factors. It is important to note that the Thermalito Powerhouse fire, RVOS accident and February 2017 Spillway Incident can be contributed in whole or part to human failures. For the CNA to truly be comprehensive, a study of Human and Organizational Factors is necessary.

Our discussion on July 18th made clear that we believe the decision of how to proceed with a modification or update in the Water Operations Manual and the consideration of Forecast Based Operations are both infrastructure related issues that should be taken up during the CNA, even if the actual process of changing that manual is a separate process with the Army Corps of Engineers.

Similarly, it is not clear to the Ad Hoc Committee if security threats (such as Terrorism) are included in this needs assessment. Guidance can be found Planning Considerations: Complex Coordinated Terrorist Attacks (FEMA, 2018).

It may be that the elements referenced above are being addressed via other DWR Efforts. If that is the case, it would be helpful to have a summary table identifying *which* Safety and Reliability related element is being addressed by *which* DWR Effort. The collection of DWR Efforts would be more appropriate as a "Comprehensive Needs Assessment," rather than the identified 6 tasks for this current study.

Significance – Medium/High

The use of the term "Comprehensive Needs Assessment" implies a more thorough examination of needs than currently proposed via the more limited scope associated with the identified six (6) tasks. The labeling of the effort as "comprehensive," when it is focused on a more limited suite of identified Safety and Reliability factors may be interpreted by the public as misleading.

Recommendations for Resolution

- 1 a. Revise the title of the project to more closely reflect the scope of this active initiative, such as

“Oroville Dam Safety and Reliability Study.”

1b. Modify the scope of the study to inventory a complete list of safety and reliability factors, not limited to items defined via Tasks 1-6.

1c. Develop avenues of public engagement for other DWR efforts taking place outside of the CNA on issues relating to Forecast Based Operations, Water Operations Manual, Security Threats, Human and Organizational Factors, etc.

REFERENCES

Capka, David E., “To Ms. Karla Nemeth, Re: DWR Response Letter to Plan to Address Findings of Independent Forensic Report, FERC Project No. 2100.” Federal Energy Regulatory Commission, Office of Energy Projects, April 11, 2018.

Federal Emergency Management Agency (FEMA). “Planning Considerations: Complex Coordinated Terrorist Attacks.” Available from: https://www.fema.gov/media-library-data/1532550673102-c4846f270150682decdba99b37524ca6/Planning_Considerations-Complex_Coordinated_Terrorist_Attacks.pdf

France, John W., Irfan A. Alvi, Peter A. Dickson, Henry T. Falvey, Stephen J. Rigbey, John Trojanowski. “Independent Forensic Team Report, Oroville Dam Spillway Incident,” January 2018. Available from: <https://www.ferc.gov/industries/hydropower/safety/projects/oroville/01-31-18.pdf>.

Knittweis, Gwen, “To Mr. Frank L. Blackett, P.E.,” “FERC Project No. 2100 – Oroville Dam, Dam Safety, Comprehensive Needs Assessment Plan and Schedule.” Department of Water Resources. January 12, 2018.

Ad Hoc Committee Comment 2

Proposed criteria by which to evaluate “safety” and “reliability” have not been provided, thus precluding the Ad Hoc Committee from communicating to the public the proposed thresholds between safe/not safe and reliable/not reliable.

Basis for Comment

This initiative has been reported to address ‘safety’ and ‘reliability’ of Oroville Dam and the appurtenant structures. It is not clear what evaluation metrics will be used to characterize ‘safety’ and ‘reliability.’ In order for the Ad Hoc Committee to effectively communicate with the public and obtain feedback on the proposed thresholds, it will be important to have an explicit listing of the types of metrics that will be used to determine satisfactory ‘safety’ and ‘reliability’ to initiate conversations and garner public input.

Similarly, identifying the proposed screening criteria (if the full list of evaluation metrics is not used to screen high-priority/immediate focus items from low-priority/delayed focus items), listing associated analytic/evaluation methods (both quantitative and qualitative), and providing the proposed quality assurance/quality control protocols will be important to understand how DWR proposes to investigate the degree of ‘safety’ and ‘reliability’ associated with Oroville Dam and its appurtenant structures.

Understanding the proposed assessment methods will enable the Ad Hoc Committee to better communicate with the public adoption of recommendations following the February 2017 Spillway Incident. As an example, the IFT (France et al., 2018) found that:

Shortcomings of the current Potential Failure Mode Analysis (PFMA) processes in dealing with complex systems must be recognized and addressed. A critical review of these processes in dam safety practice is warranted, comparing their strengths and weaknesses with risk assessment processes used in other industries worldwide and by other federal agencies. Evolution of “best practice” must continue by supplementing current practice with new approaches, as appropriate.

Will the proposed PFMA analyses be based on new and updated protocols or the pre-existing protocols that were found by the IFT to be deficient.

Further clarification via metrics and criteria on what constitutes ‘reliability’ will also be very helpful to the Ad Hoc Committee to communicate to the public the extent of assessment as part of this phase. For example, recreation is benefit afforded by Oroville Dam and gaining some understanding of the intended reliability of the recreation benefit (similar to water supply benefit; flood control benefit; power generation benefit). Evaluation of modified lake levels will impact existing recreation benefits. It is unclear if these reliability aspects are directly considered in this assessment.

Significance – Medium

Proposed criteria by which to evaluate “safety” and “reliability” have not been provided, thus precluding the Ad Hoc Committee from communicating to the public the proposed thresholds between safe/not safe and reliable/not reliable.

Recommendation for Resolution

- 3a. List the proposed evaluation metrics and thresholds that constitute ‘safety’ of Oroville Dam and its appurtenant structures.
- 3b. List the proposed evaluation metrics and thresholds that constitute ‘reliability’ of Oroville Dam and its

appurtenant structures.

- 3c. List the utilized criteria to screen high-priority elements from low-priority elements.
- 3d. Identify analytic/evaluation methods to be used in the assessment (both quantitative and qualitative) of Oroville Dam and its appurtenant structures.
- 3e. Submit the proposed quality assurance/quality control protocols for the assessment of Oroville Dam and its appurtenant structures.

REFERENCES

France, John W., Irfan A. Alvi, Peter A. Dickson, Henry T. Falvey, Stephen J. Rigbey, John Trojanowski. "Independent Forensic Team Report, Oroville Dam Spillway Incident," January 2018. Available from: <https://www.ferc.gov/industries/hydropower/safety/projects/oroville/01-31-18.pdf>.

Ad Hoc Committee Comment 3

Timely public dissemination of select relevant documentation will aid the Ad Hoc Committee to fulfil its role of ensuring the comprehensiveness of items under study, communicating accurate information and context about the current needs assessment for Oroville Dam and appurtenant structures initiative.

Basis for Comment

The Ad Hoc Committee has been charged (Ad Hoc, 2018) with the role of communicating “accurate information and context about elements of the CNA under consideration – and eventually the final document – to the stakeholders and interest groups that they represent.” In order to accomplish this charge, it will be important for the Ad Hoc Committee to be able to access and disseminate relevant documentation to the public in order to elicit input. These documents must be provided in a timely manner in order for the Ad Hoc Committee to provide DWR input from the public within the allocated timeframe for this study, which is scheduled to end in December 2019 (Knittweis, 2018).

Supplying available existing information (i.e. reports, studies, criteria) specific to ‘safety’ and ‘reliability’ will greatly facilitate the Ad Hoc Committee’s ability to: 1) verify that the CNA have incorporated all existing known concerns, 2) educate the public on what work has already been completed, 3) and identify any recommendations for future enhancement. Topics identified during the public outreach process as important to ‘safety’ and ‘reliability,’ but not directly applicable to this effort will be cataloged for future use.

The Ad Hoc Committee is scheduled to meet with DWR again in October of 2018. The High Level work plan schedule notes that Phases 1 & 2 are expected to be completed by August 31st.

Significance – Medium

Timely public dissemination of select relevant documentation will aid the Ad Hoc Committee to fulfil its role of communicating accurate information/context about the current needs assessment for Oroville Dam and appurtenant structures initiative and rapidly reverting feedback to DWR for consideration as part of this effort.

Recommendation for Resolution

4a. Provide Ad Hoc Group with report summaries and recommendations from Phase 1 & 2 studies upon completion, to improve the efficiency of meetings and the CNA process itself.

4b. Provided Ad Hoc Group with report summaries, list of awaiting work plans and future studies identified as a result of the following reports:

- current unredacted PFMA Report
- supplementary PFMA under FERC Chapter 14 for post incident / pre- modifications
- ninth 5 year FERC part 12 report
- 2014 Director Safety Review and DOE/HRD joint task force
- BOC and IFT reports and recommendations

REFERENCES

Charter for Oroville Dam Safety Comprehensive Needs Assessment, Public Ad Hoc Group (Ad Hoc).

Knittweis, Gwen, "To Mr. Frank L. Blackett, P.E.," "FERC Project No. 2100 – Oroville Dam, Dam Safety, Comprehensive Needs Assessment Plan and Schedule." Department of Water Resources. January 12, 2018.

Other Questions

1. *Directed to the IRB:* Please explain the reasoning behind examining active management of the lake levels at 350' to 640' in the context of the CNA. What is the driving force behind this question?
2. *Directed to DWR:* Will the monitoring program include a developed program for security of the entire facility while still providing access to the public to the Spillway Launch facility and access across the Dam for vehicles and walkers? (Task 6)
3. *Directed to DWR:* If it is determined an additional lower level outlet is required, what will it be used for other than for safely releasing water during high inflow periods?
4. *Directed to DWR:* The use of the term "Independent Review Board" implies a degree of freedom from conflicts of interest that may not be reflective of the Review Board Panel Members. Use of the term "independent" may be interpreted by the public as misleading. Should the IRB be renamed 'External Review Board'?