

MEETING SUMMARY

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Oroville Dam Safety Comprehensive Needs Assessment Ad Hoc Group Update #5

August 9, 2019

9:30 a.m. to 12:30 a.m.

Oroville Field Division Conference Room
460 Glen Drive, Oroville

This meeting summary provides an overview of the August 9, 2019 Ad Hoc Group meeting and focuses primarily on capturing the questions posed by Ad Hoc Group members about the Oroville Dam Safety Comprehensive Needs Assessment (CNA) and the Independent Review Board (IRB) Memorandum Number 5. It also summarizes responses to questions provided by California Department of Water Resources (DWR) staff or IRB members. This document is not intended to serve as minutes of the meeting or a transcript of the discussion. A [video](#) of and [materials](#) from the August 9, 2019 meeting are available on the CNA website: <https://water.ca.gov/Programs/State-Water-Project/Oroville-Dam-Safety-Comprehensive-Needs-Assessment>.

MEETING AGENDA

Note: Presentations and discussion on the first three agenda items ran long; as a result, the group agreed to convene again in September to cover the final three topics.

- Introductions and Opening Remarks
- IRB Report Summary and comment log
- Potential failure Mode Analysis & Existing Conditions
- Screening Criteria [WILL COVER AT LATE SEPT MTG]
- Piezometer – Early Implementation [WILL COVER AT LATE SEPT MTG]
- FIRO Effort [WILL COVER AT LATE SEPT MTG]

ATTENDEES

Co-chairs & Ad Hoc Group Members	IRB Members	DWR Staff	Meeting Support Staff & Others
<ul style="list-style-type: none">• Assemblyman James Gallagher, Co-Chair• Senator Jim Nielsen, Co-chair• Supervisor Bill Connelly	<ul style="list-style-type: none">• Betty Andrews, Environmental Sciences Associates• Bruce Muller Jr., Independent Consultant	<ul style="list-style-type: none">• Ted Craddock• Sergio Escobar• John Leahigh• Dave Sarkisian• Eric See	<ul style="list-style-type: none">• Elizabeth Williams, CNRA• Les Harder, HDR• Rhonda Robins, HDR• Steve Verigin, GEI• Alexander, Student from Norway• Terra Alpaugh, Kearns & West

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- Sheriff Kory Honea, Captain Derek Bell, Lieutenant Steve Collins
 - Curtis Grima
 - Matt Mentink
 - Rob Olmstead
 - Laura Page
 - Rune Storesund
 - Ron Stork
 - Paul Schweiger, Gannett Fleming, Inc.
 - Leilo Mejia, Geosyntec
 - Julie Leimbach, Kearns & West
 - Nick Brubaker, Council Oak

QUESTIONS FOR DWR and IRB

Overview of Information Presented

DWR explained that, as with previous Ad Hoc Group (AHG) meetings, the presentations would be very similar to those given at the July 11, 2019 IRB meeting. IRB members presented an overview of the recommendations they made to DWR in their fifth memo. DWR staff provided information on the Existing Conditions Assessment and Potential Failure Mode Analysis (PFMA) done as part of the CNA and as part of the federally mandated Level 2 Risk Assessment. Due to time constraints, the Chairs decided to end the meeting before presenting on screening criteria, early implementation of piezometers, or the FIRO effort; they agreed to convene an additional meeting in September to cover these topics. Presentation slides for all agenda items were shared on the website as part of the materials.

Throughout and following these presentations, AHG members posed questions and comments to DWR staff and IRB members; these are organized by agenda topic below. The respondent (i.e. DWR or IRB) is indicated in parentheses before each response.

Questions on summary of IRB report and comment log

- Question (Q): One of the concerns during the Spillways Incident was the possibility of losing power to the gates. Are the power backups described by the IRB in their presentation new? Do they reduce the risk that the gates would be inoperable during a prolonged power outage? Has the power line that used to go across the emergency spillway been moved? How often is maintenance performed on the power backups? How long can the power back up sources, including the generators, provide power?
 - Response (R) (DWR): The backup measures were in place during the Incident, but there was uncertainty of whether they all would be accessible in the event of a power outage. There was particularly uncertainty around whether power from

the Hyatt powerhouse would be available. The gates now have five redundant sources of power they can draw on: the primary source is the Thermalito Power Plant; the second is the PG&E line, which no longer crosses the emergency spillway; the third is the Hyatt Power Plant; the fourth is an on-site standby emergency generator; and the fifth is to bring in an additional emergency generator. The standby generator supplies fifty hours of power under load, but the gates only require load to open/close; they do not require power to stay open. The standby generator is maintained and tested monthly.

- Q: Can the IRB provide examples of the “conceptual measures” DWR is developing to reduce the risk associated with the emergency spillway?
 - R (IRB): For the emergency spillway, examples including doing nothing, lining the hillsides all the way down to the diversion pool, and creating a channel – either a straight channel or an S-shaped channel to mimic the topography. The discussion at the last IRB meeting was intended to elicit IRB input on DWR’s process for developing these alternatives, rather than focus on the specifics of these options. The IRB expects to hear more details at the sixth IRB meeting.
- Q: How does DWR plan to continually evaluate the area beneath the spillway? Is there a means to do underground surveys (e.g., to check if roots are eroding the foundation)?
 - R (IRB): The design of the emergency spillway does not rely as much on drainage; instead, the sheer weight of the roller-compacted concrete is used to keep it anchored.
 - R (DWR): In addition, there were 176 holes drilled into the bedrock underneath the apron for venting of any water.
- Q: Can we review a copy of the bid package for the completed work on the emergency spillway?
 - R (DWR): The emergency spillway construction work did go out for bid by a group of selected contractors but parts of the design are categorized by FERC as critical energy infrastructure information (CEII). DWR will need to review what parts of the materials they can share publicly in order not to reveal vulnerabilities.
 - R (AHG): The AHG is intended to provide a group of public representatives the opportunity to review DWR’s analysis and independently verify that their representation of their work matches the primary documents. If AHG members do not have access to these documents, they cannot effectively vet the CNA process on behalf of the public. We understand that the CNA AHG is an experiment, and DWR is figuring out how to best share information so that the public can access enough to assess their process. DWR and AHG should discuss what has worked in the AHG process and what can be improved to more effectively build trust.

- Comment (C): The AHG likes having the CNA Existing Conditions Assessment and the federally mandated Level 2 Risk Assessment to compare side by side. They are interested where the two differ significantly.
- Q: Can you elaborate on the difference between a direct and an indirect cost?
 - R (IRB): The IRB's sense was that this terminology as currently being used in the CNA process is generated from an asset management framework. However, the CNA Risk Assessment is intended to be a dam safety/water resource management study, so their terminology should align with the intended purposes. Asset management is more concerned with the allocation of existing resources within the organization for infrastructure or operations (i.e., direct costs). Dam safety/water resource management must look more broadly to consider the economic or societal impacts of events (even those where the likelihood is extremely low) that may justify building or expanding facilities in ways not currently planned. The IRB has recommended that DWR explore these indirect costs to help them determine which CNA alternatives they should implement to adequately manage risk to the public.
 - R (DWR): DWR received the IRB's recommendation and expects this to be a topic of discussion at a future IRB meeting.
- Q: The comment log designates the status of IRB recommendations (e.g. "under consideration," "in progress," "closed"). There is a recommendation in the log that is marked as "closed," but DWR's response is still underway. Can you explain the rationale for marking this as "closed"?
 - R (IRB): In the referenced case, we recommended an additional CNA task to ensure all the other tasks were integrated. Rather than create a separate task, DWR created an integration team to integrate information across tasks and identify any gaps or inconsistencies. Once DWR established that team and the IRB saw evidence that it was working effectively to address cross-task issues, the IRB considered their recommendation "closed."
 - C (AHG): If that rationale were included as part of the log, we could better understand why items are "open" or "closed."
 - R (IRB): We will work with DWR to include a full description of why each item is designated open or closed.
 - C (AHG): The AHG would also like a better understanding of what "integration" entails.

Questions on Potential Failure Mode Analysis (PFMA) & Existing Conditions Presentation

- Q: Is the cost of evacuation a direct or indirect cost?
 - R (DWR): I do not recall how that particular cost was treated in this analysis. *(After the meeting DWR confirmed that the cost of evacuation was treated as an indirect cost)*

- C: If you look at the original Army Corps guidance, the guidelines for “tolerable risk” were based on the existence of trust between the community and the agency doing the assessment. Did you do any evaluation of how those lines might move if trust did not exist?
 - R (IRB): USBR has had to address that issue since the level of trust between communities and government agencies is inconsistent. USBR wanted to provide a consistent evaluation of risk regardless of trust. Therefore, they did not use these lines as criteria to determine whether a dam should or should not be modified; instead, they used the guidelines as the beginning of a conversation to help parties focus on the aspects of the dam that most need attention.
 - C (AHG): It would be interesting to hear more about USBR’s community engagement work and how those “tolerable risk” lines should be defined.
- Q: The 2014 PFMA did not develop the emergency spillway erosion scenario that occurred in 2017. Wasn’t part of that decision based on the myth that the underlying rock was solid and could not erode?
 - R (DWR): No, DWR knew that the rock on the hillside could erode, though maybe not that it would do so preferentially close to the monoliths. However, the FERC PFMA process, including the Level 2 Risk Assessment, focuses on potential failure modes that lead to “ultimate failure conditions” resulting in an “uncontrolled release of the reservoir.” The 2017 erosion did not lead to an uncontrolled release of the reservoir, but it was still unacceptable given the consequences to the infrastructure and surrounding community. There is recognition that in the future, DWR needs to more fully consider *partial* failure modes that result in *heavy damage* even though they do not lead to uncontrolled release.
- Q: Did any of the PFM scenarios consider the impact of upstream dams breaching?
 - R (DWR): Not explicitly, but they considered the probable maximum flood (PMF) as well as both 40,000 and 100,000 year events, which would encompass flows of the size you are referring to.
- Q: What is the breakdown of what regulatory compliance attributes mean (e.g., what is the difference between a three and a five)?
 - R (DWR): We have criteria and sub-criteria for regulatory compliance attributes. Regulatory compliance involves compliance with federal power regulators, dam safety regulators, and environmental regulators. We rate criteria such as whether PFMs could result in a violation that increases oversight, incurs fines, or results in removal of the project’s authority to operate. Many of the details related to the potential failure modes are categorized as CEII. DWR is trying to summarize those PFMs at a level where we can share them with the public. We would like to discuss this at a future AHG meeting.
- C (AHG): The AHG wants to act as a liaison to bring the CNA to the community. The AHG can help DWR understand the gap between what is technically correct in the engineering world (e.g., “the emergency spillways worked as designed”) and what people in the community perceive (e.g., “DWR could not control how much water was coming over the emergency spillway”). In addition, AHG members may have insight to contribute about the kinds of redundancies that should be considered.

- C (AHG): It would be helpful to have bracketed ranges of flow volumes to help the community understand the implications of particular flows and the risks at those volumes. That way the public can have more informed conversations around operations and levels of acceptable risk.
- C (AHG) FERC standards should be the minimum floor for dam safety; Oroville should be a leader in dam safety.
- R (DWR): Congress mandated a Level 2 Risk Assessment. The IRB made 16-18 recommendations on how to improve the Level 2 process, all of which DWR has adopted as part of the CNA and the Level 2. The CNA is an unprecedented effort in the dam safety world. Nothing this comprehensive has ever been mandated by FERC.
- C (AHG): The AHG is excited to see the outcomes of the CNA. At the end of the process, DWR should develop an outline to show what the “status quo” approach to a risk assessment/assessment of existing infrastructure was prior to the CNA, and then show all the areas where the CNA has improved that process.
- C (AHG): The AHG is hungry for additional information. Our initial impression was that the AHG meetings would be a redacted version of the IRB meetings, but they are much less substantive. These are Risk 101 meetings. The AHG wants more substance in the DWR presentations and more time in the agenda to share the public’s perspective with DWR.
 - C (DWR): There is a tremendous amount of experience in the AHG. DWR is trying to build the group’s knowledge and understanding of the technical issues, so that they can understand DWR’s conclusions. DWR requests the group’s patience during this knowledge-building process.
- Q: As part of the CNA, is anyone doing physical tests on the facility (e.g., core testing, drilling)? What the consultants and the IRB basing their assessments on? If they are basing all their assessment on information provided by DWR, their conclusions will be flawed; that information is not “real.” The community does not trust DWR. Regardless of FERC’s definition of “failure,” everyone who lives below the dam would say that the emergency spillway release in 2017 was uncontrolled and therefore, a failure.
 - ~~R (AHG):~~
 - R (DWR): FERC, DSOD, and a separate IRB reviewed the design specifications; they provided comments which were then incorporated into the final design. FERC and DSOD inspectors were on site every day during construction and assessed the adequacy of every part of the foundation before concrete could be laid. There is ongoing inspection from FERC and DSOD, as well as oversight from the IRB and assessment via the CNA process. With regard to testing, DWR drilled holes in both spillways to ensure performance; on the emergency spillway, there are holes for drainage which also allow us to map and monitor the groundwater levels. The new drains allow independent cleanout and the ability to send a remotely-operated vehicle in.
 - R (AHG): To clarify, the AHG is not concerned about the new construction; that was done well. We are concerned about the existing facilities; the same people

who built the failed spillways built the entire dam. Therefore, we want an independent physical inspection of the dam.

- R (DWR): FERC requires independent physical inspection of the facilities and data, and both they and DSOD have inspected the dam.
- R (AHG): FERC and DSOD both inspected the spillway and failed to identify its weaknesses in the past.
- Q (AHG): The Independent Forensic Report stated that prior to the Spillways Incident, DWR had “normalized deviance” regarding the spillways’ condition. For instance, DWR reused language from past accurate geologic reports, but cut out introductory caveats that would have explained potentially worrisome conditions. This negatively affected the ability to do a good PFMA. The Independent Forensic Team also pointed out that in past analysis of and voting on potential failure modes, the number of DWR participants was overwhelming and even those participants who were not DWR employees were primary DWR contractors; this kind of insularity created groupthink. How did DWR address those concerns for the CNA PFMA process?
 - R (DWR): DWR employees were part of the discussions. Evaluators do a first round of voting on estimated consequences, then they discuss the results as a group (including DWR employees); the evaluators can change their estimates based on DWR input but they do not have to. No DWR staff’s vote is counted in the Level 2 Process. During the Level 2 process, FERC, Eric Halpen (USACE), and Steve Townsley (USACE) – all outside experts -- provided real time oversight.
 - C (AHG): We want to know what percentage of people working on the Level 2 Risk analysis worked or had worked for DWR. There is still significant lack of trust. We need to rebuild that trust, but in order to do so, the AHG needs enough information to defend DWR when presented with legitimate public questions.
 - R (DWR): DWR has tried hard to make the Level 2 and CNA analyses independent. We have taken the Forensic Team findings into account but have also tried to make DWR staff available to answer questions and provide context.
 - C (AHG): It is good to hear that the final decision on PFMs is being made by independent experts.
- Q: What is the need to finish the CNA by May 2020? Should we consider extending the CNA timeline so that it can proceed in parallel with the Level 2 Analysis in order to identify mitigation measures?
 - R (DWR): The CNA has already been delayed by nine months as compared to the original schedule. The CNA will be consistent with the Level 2 assessment if not exactly the same.
 - C (AHG): We are most interested in where the Level 2 and CNA PFMA’s are not the same, because this suggests the base assumptions are different, which means this is where we will learn the most. Communicating these differences and the reasons for them to the public will help legitimize the process.
 - R (DWR): We agree that comparing the two processes will add an additional level of rigor. If outliers remain different, DWR will need to explain and justify those differences.

- C (AHG): I believe the scope of the CNA extends beyond dam safety to flood water management. This should result in recommendations for a new flood manual or interim flood manuals. Related, FERC has requested that DWR stop using the term “emergency spillway,” and instead refer to it as an “auxiliary spillway.”
 - R (DWR): DWR recognizes that FERC thinks the emergency spillway functions as an auxiliary spillway; however, by calling it an auxiliary spillway, there is an implication that it will be used more and with less damage. DWR is still in the middle on the spillway task for the CNA, which is assessing how both spillways will perform under a range of flows, including the standard project flood and the probable maximum flood (PMF). That assessment will decide whether those consequences are acceptable or whether they need to be mitigated, at which point they will decide how each structure should be used in the future. It would be premature to rename the structure until those determinations are made.
 - R (AHG): We need a briefing on how the PMF is now being defined.
- C (AHG): Please communicate with the AHG between meetings. Reach out to members to clarify their questions and ensure DWR understands their intent. It could be beneficial to create a subcommittee in which a few AHG members discuss the questions with DWR. If AHG questions are answered adequately in advance, it will allow us to move more quickly through content in the meetings. In addition, ask members what they are interested in and build those items into the agenda.

IMPORTANT DATES

- Ad Hoc Group Meeting #4 presentations and video published to website – 8/2019
- Ad Hoc Group Meeting #3 summary posted to website – 9/6/19
- Ad Hoc Group questions and comments due to DWR and IRB – 9/13/19
- Ad Hoc Group Meeting – 10/16/19
- IRB Meeting #4 – 10/17/19
- Ad Hoc Group Meeting #6 material posted online – 11/1/19
- Ad Hoc Group Meeting #6 – TO BE RESCHEDULED