

Comments and Recommendations / Independent Review Board

Updated 8/30/2020

Oroville Comprehensive Needs Assessment Project

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Comment No.	IRB Comments/Recommendations	CNA Project-Level Action to Address the Recommendation	Responsible Lead	IRB Status Assessment	Date Closed	IRB Assessment Comments
M01-01	The IRB recommends that the CNA Project Team develop a plan for execution of project integration, perhaps under a Task 7. As part of this new task, interdependencies between the tasks and between Tasks 1-6 and Task 7 (or project integration) should be mapped out and reflected in the project schedules for all tasks.	Concur. To date, we have: <ul style="list-style-type: none"> <li>Formed Integration team.</li> <li>Developed Integration Project Management Plan (PMP) (in process).</li> <li>Developed CNA workplan showing interdependencies (in process).</li> </ul>	Rhonda Robins, Steve Verigin	Closed	12/14/2018	While not identified as Task 7, the project integration team meets the intent of this recommendation.
M01-02	The IRB recommends the CNA Project Team broadly identify potential dam safety issues and concerns, including issues not specifically addressed in the six CNA Tasks, and conduct a screening level risk assessment to better understand the magnitude of risk associated with each issue or concern. If any of the issues or concerns indicate a need for expedited action, proceed to identify and implement actions necessary to reduce the risk either permanently or temporarily while the planning study proceeds.	Concur. <ul style="list-style-type: none"> <li>Will occur in the context of the Part 12D PFMA/FERC Level 2 Risk Analysis workshops, within Task work, and in Project-level work.</li> <li>Will recommend expedited actions as they are identified.</li> <li>Existing conditions and current risks will also be identified in the upcoming CNA Existing Conditions Assessment, a preliminary semi-quantitative risk analysis scheduled for April 2019.</li> <li>Existing conditions risk assessment is complete. Results were included in the IRB meeting materials folder and presented at IRB Meeting No. 6.</li> </ul>	Steve Verigin	Closed	10/17/2019	With the completion of the assessment of existing conditions, sufficient information has been provided to consider this recommendation to have been completed. The risk estimates for the potential failure modes do not reveal any risk estimates that would appear to warrant expedited action separate from the CNA process. In those cases where DWR is proceeding with additional studies or data collection, the IRB considers these actions to be reasonable and prudent.
M01-03	The IRB recommends the CNA Project Team establish evaluation criteria for alternative selection prior to formulating alternatives.	Concur. <ul style="list-style-type: none"> <li>First draft of evaluation criteria presented at IRB Meeting No. 2.</li> <li>Further development of evaluation criteria and adoption of DWR Asset Management Risk Matrix presented at IRB Meeting No. 3.</li> <li>Final Draft evaluation criteria to be presented at IRB Meeting No. 4</li> </ul>	David Ford	Closed	3/15/2019	The project team has presented a set of factors for evaluating measures and alternatives that appear reasonable and appropriate for the purpose of the CNA.
M01-04	The IRB recommends that in the initial phase of each task, the CNA Project Team explicitly state an objective of identifying what is working well to ensure that proposed alternatives do not harm operations that are working well.	<ul style="list-style-type: none"> <li>Concur. Compiling this information.</li> <li>Concur. Current version of project-level report has "what is working well" in Section 6.2, as part of the description of the existing condition of the dam and appurtenant structures.</li> <li>In the latest versions of the reports, this information is included in, but not specifically called out in, Section 5.1 of the task reports and Section 6.1 of the project report. We can revise these sections to give this information more visibility.</li> </ul>	Rhonda Robins	Closed	5/22/2020	The IRB found mention of this matter in section 6.1.3 of the CEII Project Report and section 5.1 of the Task 4 report. The intent of this recommendation was to assure that proposed risk reduction measures would "do no harm" to the facility. While not enumerated in the reports, The IRB believes that the proposed measures conceptually achieve this objective, although further studies for any selected plan would have to continue to emphasize this principle.
M01-05	The IRB recommends that the CNA Project Team include gain or loss of project benefits amongst the consequence categories to be considered in evaluating risk reduction.	Concur. <ul style="list-style-type: none"> <li>This will be included in the risk assessment consequences.</li> <li>Will document Project benefits in developing and evaluating alternative plans.</li> <li>This will be captured in the five Project Objectives, Existing Conditions Assessment, and in the evaluation criteria</li> </ul>	Steve Verigin	Closed	3/15/2019	The IRB believes that the evaluation criteria presented take this recommendation into account.

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M01-06	The IRB recommends that the CNA Project Team evaluate and document existing components and alternatives with respect to their robustness, redundancy, reliability, and resiliency.	Concur. <ul style="list-style-type: none"> <li>Will be included in evaluation criteria.</li> <li>These factors are now captured in the individual task <i>Measure Development Objectives</i> and in the <i>Considerations</i> used to evaluation criteria used to evaluate how measures/plans meet Project Objectives.</li> <li>Insights into existing facilities' reliability, robustness, redundancy, &amp; resiliency (RRR&amp;R) have been gained through the existing conditions risk assessment. For instance, in order to safely pass the PMF, the FCO must be fully functional in the existing configuration. Further, RRR&amp;Rs will be used in comparing the Alternative Plans.</li> <li>The Project Team has used USACE's most recent update on resilience, "Engineering and Construction Bulletin No. 2018-2," January 25, 2018 for evaluation of task measures and alternative plans. Documentation is provided in draft task reports and alternative plan presentations for IRB meeting no. 7.</li> </ul>	David Ford	Closed	5/22/2020	The IRB found this to be well documented in the project report with respect to the process used for evaluation of the proposed plans.
M01-07	The IRB recommends that the CNA Project Team consider adopting a "value planning" approach to the development of alternatives.	Concur. <ul style="list-style-type: none"> <li>Risk, benefits, and cost efficiencies will be considered throughout conceptualization and selection of measures and alternatives.</li> <li>Measures and Plans will first be evaluated for their ability to meet Project Objectives. A second round of evaluations will consider the costs to implement Measures/Plans to better determine the cost efficiency of alternative Measures/Plans in reducing risk (i.e. risk reduction/dollar).</li> <li>Processes for development of initial conceptual, candidate, consolidated candidate and feasible measures have been completed. Those processes and the results of measure development were presented at IRB Meeting No. 6.</li> </ul>	Rhonda Robins, David Ford	Closed	10/17/2019	Based on the process presented at IRB Meeting #6, it appears that DWR has chosen to use an alternate process for the development of measures that is sufficient for the intended purpose. Implementing a value planning approach at this stage would not further benefit the CNA study.
M01-08	The IRB recommends that the CNA Project Team adopt the principle of "begin with the end in mind" which can be implemented by outlining the final reports as soon as possible.	Concur. <ul style="list-style-type: none"> <li>We developed and distributed a report outline for review. Currently, we are continually updating the Final Report Draft outline and will present at IRB meetings.</li> <li>Updated Final Report Draft outline presented at IRB Meeting No. 3</li> <li>Draft Task Report Outline developed and will be presented at IRB Meeting No. 4</li> </ul>	Rhonda Robins	Closed	3/15/2019	The project integration team has added a member to specifically facilitate this recommendation. Having seen the report outline and an initial draft for one task, the IRB considers this recommendation as having been implemented.
M01-09	The IRB recommends that an effort be undertaken to define a common understanding of the terminology to be used across all tasks.	Concur. We are: <ul style="list-style-type: none"> <li>Developing (Draft #1 of the) CNA glossary.</li> <li>Developing (Draft #1 of) a memo defining the baseline and future without-project condition.</li> <li>Have updated the CNA Glossary and shared Version 2 of the Glossary with the IRB during IRB Meeting No. 2.</li> <li>Continuing to develop a memorandum defining the current without-plan condition.</li> <li>Continuing development of CNA glossary that will be included in the final project report.</li> <li>The glossaries of the reports are still in draft. We will finalize them along with the other content of the reports.</li> <li>The definitions and abbreviations have been completed and included in the appendices of the reports.</li> </ul>	Rhonda Robins	Closed	8/28/2020	The IRB commends the project team for developing a list of abbreviations and a glossary that have been included in the reports. CEII Project Report – Included as Appendix A Public Report – Included as Appendix A Task 1 Report – Included as Appendix A Task 2 Report – Included as Appendix A Task 3 Report – Included as Appendix A Task 4 Report – Included as Appendix A Task 5 Report – Included as Appendix A Task 6 Report – Included as Appendix B
M01-10	The IRB recommends that quality management be viewed more holistically than just quality control and quality assurance.	Concur. We are: <ul style="list-style-type: none"> <li>Working closely with Task team leads to maintain consistent quality across Tasks.</li> <li>Including Task team leads in quality management of Project-level documents.</li> <li>Reviewing Task progress at bi-weekly meetings.</li> </ul>	Steve Verigin	Closed	12/14/2018	It is apparent to the IRB that the Project Integration Team is serving as a key element of quality control/assurance. The IRB has also seen evidence of committing additional resources as necessary to assure that all tasks have the necessary resources to do quality work.

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M01-11	The IRB recommends that the CNA Project Team consider a holistic approach to the evaluation of all mechanical, electrical, and control systems required for the safe operation of Oroville Dam, including those associated with operation of the Hyatt Powerplant.	<p>Concur.</p> <ul style="list-style-type: none"> <li>The Project will review all mechanical, electrical, and control systems for the following facilities:                             <ul style="list-style-type: none"> <li>- HPP and intake</li> <li>- RVOS outlet</li> <li>- Palermo outlet</li> <li>- FCO headworks</li> </ul> </li> <li>Potential failures of mechanical and electrical systems are being considered in the PFMA, Level 2 Risk Analysis, and upcoming CNA Existing Conditions Assessment workshops.</li> <li>Evaluation of mechanical, electrical and control systems have been completed by Tasks 3 and 4. Results from the existing conditions assessment were provided in the IRB meeting materials package and were presented at IRB Meeting No. 6 along with developed risk reduction measures.</li> <li>Additional information is presented in the Task 3 and 4 draft reports, describing the mechanical equipment walk-down assessments.</li> <li>Descriptions and recommendations from the HPP seismic walkdown have been included in the Task 4 report and the Executive Summary of the CEII Project Report (Section 1.12.2, Bullet 5) and Chapter 11 (Section 11.5.3).</li> </ul>	Chris / Bob	Closed	8/28/2020	The recommendation in the CEII Project Report for interim risk reduction actions specifically addresses the 2019 seismic walk down inspection.
M01-12	The IRB recommends that the CNA Project Team consider evaluating plans for providing redundancy in external systems that deliver power to the grid, as part of its evaluation of the low-level outlet facilities.	<p>Concur.</p> <ul style="list-style-type: none"> <li>DWR internal discussions are ongoing.</li> <li>Task 4 will examine and review existing redundant systems to help deliver power to the grid.</li> </ul>	Les Harder	Closed	12/14/2018	DWR has presented information to help the IRB understand the relationship with PG&E for bulk power distribution. DWR has demonstrated an understanding of the critical importance of the bulk power grid to enabling releases from the Hyatt Powerplant.
M01-13	The IRB recommends that any risk assessment, whether at the task or project level, include an explicit statement of assumptions that form the contextual basis of that assessment.	<p>Concur. We will:</p> <ul style="list-style-type: none"> <li>Define baseline condition, and state assumptions therein.</li> <li>State assumptions clearly for all alternative plans and with-project conditions.</li> <li>Existing Conditions Assessments and evaluation of potentials Measures/Plans will consider PFMs that will describe the Initiation, Progression, and Continuation to Failure, along with a definition of what failure means.</li> <li>Detailed results of the existing conditions assessment have been provided to the IRB in advance of Meeting No. 6.</li> <li>Additional detailed risk assessments will be conducted in the process of evaluating Alternative Plans.</li> <li>Additional documentation is presented in the task reports.</li> <li>Finalization of task-level PFM documents is still in progress.</li> </ul>	David Ford	Closed	5/22/2020	The IRB found detailed information about each PFM and how it's risks were estimated in the following Appendices: Task 1 – Appendix J Task 3 – Appendix I Task 4 – Appendix E Task 5 – Appendix I
M01-14	The IRB recommends that the title of Task 1 be revised to: "Alternatives Evaluation to Ensure Spillway Integrity to Safely Pass the PMF".	<ul style="list-style-type: none"> <li>Will review and present all Task titles at IRB Meeting No. 3.</li> </ul>	Sergio Escobar	Superseded		See recommendation M3-7
M01-15	The IRB recommends that the CNA Project Team question previous assumptions regarding downstream consequence thresholds and take advantage of the new incremental dam breach hydraulic analyses to develop accurate consequence information.	<p>Concur.</p> <ul style="list-style-type: none"> <li>We will develop accurate consequence information using best-available information.</li> <li>The updated consequence thresholds are in current use with the Part 12D Level 2 Risk Analyses and will be used by the upcoming CNA Existing Conditions Assessment.</li> </ul>	David Ford	Closed	12/14/2018	DWR has committed to using updated consequence thresholds and has a plan for integrating this assessment with Part 12D level 2 risk analysis.

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M01-16	The IRB recommends the CNA Project Team either address how climate change has been accounted for in developing the operational plan for the facility, including potential changes in hydrograph shape, size, and seasonality, or explain why it is not a concern.	<p>Concur.</p> <ul style="list-style-type: none"> <li>• Currently we are developing a plan for addressing climate change in the CNA project.</li> <li>• This has now been added as one of the Measure Development Objectives for Task 2.</li> <li>• The Task 2 team recognizes that hydrograph shape, timing, and seasonality can impact reservoir releases. In the analyses completed thus far, and will continue through the CNA, multiple size events and hydrograph patterns are reflected in assessment of the operation plans and alternatives. Both annual maximum and seasonal frequency curves were developed and used to develop inflow hydrographs for a range of volumes and exceedance probabilities. These inflow hydrographs were patterned on the largest observed historical events. The Task 2 team is currently investigating the potential use of Forecast Informed Reservoir Operations (FIRO) at Oroville. Implementation of FIRO could add additional flexibility in operations that would be beneficial given the potential for intensification of precipitation events and reductions in snowpack water storage associated with climate change. A more detailed investigation of FIRO will also be recommended for inclusion in an Oroville Water Control Manual update.</li> </ul> <p>Please see response in comment No. M07-10.</p>	Steve / Dustin Jones	Closed	5/22/2020	Climate change is directly addressed in section 4.4 of the Task 2 Report and sections 1.10.4, 10.2.1, 10.5.1, and 10.7 of the CEII Project Report. Climate change is also recognized through the discussions of resilience in each report reviewed.
M01-17	If not already completed, the IRB recommends that the Task 3 be expanded to include the hydraulic performance of the FCO Spillway as it relates to the operation of the FCO gates.	Hydraulic analysis of FCO gate structure and chute have been completed by Spillways Recovery Design Team. Currently viewed as a constraint in Tasks 1, 2, 3, and 4.	Steve Verigin	Closed	12/14/2018	DWR has provided information regarding the allowable imbalances in gate discharges. The IRB considers this information to be sufficient to close this recommendation.
M01-18	The IRB recommends that the information describing the reservoir evacuation deficiency be added to the scope of work for task 4 to provide context.	<p>Concur.</p> <ul style="list-style-type: none"> <li>• Will be listed as an issue and opportunity.</li> </ul>	Les Harder	Closed	12/14/2018	DWR plans to address this in the CNA Study documentation. The IRB will verify that this has been done when the final draft report becomes available .
M01-19	The IRB recommends that the project summarize and document the analysis and/or assumptions relative to sedimentation in the reservoir at the dam.	<p>Concur.</p> <ul style="list-style-type: none"> <li>• The Task 4 Team for the Low Level Outlets will include a brief description of the recent ROV survey of the intakes of the two diversion tunnels (Diversion Tunnel No. 1 and No. 2). This survey found that sediment had covered the lower intake for Diversion Tunnel No. 1 and had filled the intake of the higher Diversion Tunnel No. 2 up to about Elevation 225 feet or so (about the lower half of the tunnel intake). Fortunately, Diversion Tunnel No. 2 has an upper intake at Elevation 340 feet, and this allows water to flow to the River Valve Outlet System. Any available estimates of future sedimentation over time will be documented in the Task Team 4 report. In addition, the current and future sedimentation will be documented as one of the factors as to why Candidate Measures for a new low level outlet with intakes at Elevation 225 feet and 310 feet were eliminated in favor of other Low Level Outlet Measures with intakes at Elevation 340 feet or higher.</li> </ul>	Les Harder	Closed	8/28/2020	The IRB believes that the language included in the Task 4 report adequately addresses this recommendation.
M01-20	The IRB recommends that the project also include an assessment of the benefits that could be derived from making the reservoir volume between elevations 350 feet and 640 feet available for active management.	<p>Concur.</p> <ul style="list-style-type: none"> <li>• Will be evaluated in Task 4 and applied to other tasks as appropriate.</li> <li>• Currently identified as the T4-6 Measure Development Objective for Task 4.</li> <li>• Task 4 Team has evaluated alternative intake elevations for potential new low-level outlet works facilities. Results were presented at IRB Meeting No. 6.</li> <li>• Several low-level outlet intake elevations were considered in the formulation of alternative plans which will be presented at IRB Meeting No. 7.</li> <li>• Additional information on development of low-level outlet measures is included in the Task 4 draft report</li> </ul>	Dustin Jones	Closed	2/28/2020	The task 4 report has included information qualitatively addressing this potential benefit. More detailed information would be considered to be in the domain of future feasibility studies if there is a decision to proceed with a new low level outlet.

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M01-21	The IRB recommends that Task 5 include developing recommendations, as appropriate, for future collection of additional data on the embankment characteristics that would significantly reduce uncertainty for the evaluation of the dam embankment reliability.	Concur. <ul style="list-style-type: none"> <li>• These tasks are being completed by DWR in response to FERC 2014 Part 12D recommendations</li> <li>• Tasks 5 and 6 have identified an Early Implementation Project to install 11 new piezometers in the Oroville Main Dam, which will better determine water levels within the dam and foundation, and will provide an opportunity for in situ and laboratory testing of downstream shell materials.</li> <li>• Plans are being developed for piezometer installations.</li> </ul>	Steve Verigin	Closed	2/28/2020	DWR is in the process of implementing this project to address this recommendation.
M01-22	The IRB recommends that future presentations to the public and the final project report provide a description of the rationale for the tasks included in the project.	Concur. <ul style="list-style-type: none"> <li>• Presented at IRB Meeting No. 2 and Ad Hoc Committee Meeting No. 2.</li> <li>• The 6 tasks address all major facilities at Oroville Dam (all 3 embankment dams (Main Dam and 2 saddle dams - Task 5), both spillways (Emergency and FCO- Tasks 1 and 3), all three outlets (Hyatt PP, Palermo, RVOS) as well as a potential new outlet - Task 4, as well as operations - Task 2, and performance monitoring/instrumentation - Task 6. It is a pretty comprehensive evaluation of existing conditions for all Oroville facilities as well as looking at ways to improve the reliability of the facilities to perform consistently with their purpose and design intent.</li> <li>• A presentation of the draft project report will be made at IRB Meeting No. 7. This detail will be included in the final report but the presentation may not cover that detail.</li> <li>• The rationale for the task is also briefly covered in the task reports included in the IRB Meeting No. 7 folder.</li> </ul>	Steve Verigin	Closed	2/28/2020	Section 4.1.1 of the draft project report seems to address this recommendation.
M02-01	The IRB recommends that plan options be evaluated using a structured Multi-Criteria Decision-Making approach such as "choosing by advantages."	Noted. <ul style="list-style-type: none"> <li>• Will respond with updated evaluation criteria and approach at IRB Meeting No. 3.</li> <li>• Draft Final Evaluation Criteria to be presented at IRB Meeting No. 4. Methods such as " <i>Choosing by Advantage</i> " found not to be best fit for CNA as the results of CNA Initiative will not be a single alternative or Plan, but a small number of alternative Plans for future consideration by DWR in reducing risks and improving reliability of all dams and other facilities in the SWP portfolio. However, the two-round approach in " <i>Choosing by Advantage</i> " whereby cost of the alternative Plan is considered in the second round for considering cost efficiency in reducing risk will be adopted in the CNA approach.</li> <li>• Plans are in progress for developing Alternative Plans and include multi-criteria decision-making approaches.</li> <li>• An Alternative Plans development workshop is scheduled for 10/22/2019.</li> <li>• Presentation of the use of "Choosing by Advantages" and organization of plans described by themes will be made at IRB Meeting No. 7.</li> </ul>	David Ford	Closed	2/28/2020	The IRB believes that DWR is on the right track with their planned actions based on presentations to date.
M02-02	The IRB recommends that "permittability" or "minimizing permitting challenges" be added to the list of evaluation criteria.	Concur.	David Ford	Closed	12/14/2018	The IRB considers this recommendation to be complete based on inclusion within the "Compliance" consequence category.
M02-03	The IRB recommends that all evaluation criteria be framed as the measurement of positive outcomes.	Concur. <ul style="list-style-type: none"> <li>• Second draft of evaluation criteria will be presented at IRB Meeting No. 3.</li> <li>• Draft Final Evaluation Criteria will be presented at IRB Meeting No. 4. As presented in IRB Meeting No. 3, Evaluation Criteria will be based on the existing DWR Asset Management Matrix. The 5 Project Objectives and the Consequence categories to be evaluated are from the Asset Management Matrix and are oriented to maximize positive outcomes or to minimize negative outcomes, which is also a way to measure a positive result.</li> </ul>	David Ford	Closed	3/15/2019	The IRB has concurred with using as much of DWR's Asset Management risk assessment matrix as possible. The IRB concurs that minimizing a negative outcome is a positive result.

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M02-04	The IRB recommends that among the approaches to plan formulation considered, the CNA Study Team include the development of plans focused on addressing different "themes," or collections of attributes captured by the evaluation criteria.	Concur. <ul style="list-style-type: none"> <li>Under development.</li> <li>Will be carried out at the Project Integration level following the development of viable Measures that will be completed by the individual Task teams.</li> <li>Themes will be utilized in developing Alternative Plans during the 10/22/2019 Workshop and afterward.</li> <li>Presentation of the themes used in the alternative plans process will be presented at IRB Meeting No. 7.</li> </ul>	David Ford	Closed	2/28/2020	The team has included multiple themes in the formation of the alternative plans.
M02-05	The IRB recommends that the basis for the 150,000 cfs flow constraint be substantiated in the documentation for the CNA studies, and encourages the use of risk-based information in the analysis by performing sensitivity analyses to assess the relative risk for various flow levels. The IRB recommends that the sensitivity analysis be performed for releases from the dam ranging from 100,000 cfs to 200,000 cfs in increments of 10,000 cfs for use in operational decision-making, both for interim operations and possibly for long-term revisions to the WCM. This analysis should include an estimate of the return period or recurrence interval associated within this range of incremental flow releases.	Noted+D33. <ul style="list-style-type: none"> <li>Will consider and include in technical task details.</li> <li>Background work has been performed and is under review as of 10/14/2019.</li> <li>The 150,000cfs release threshold is set in the USACE 1970 WCM and is associated with downstream levee safety in consideration with releases from New Bullards Bar Dam.</li> <li>The Task 2 FIRO studies analyzed operations scenarios to stay below the 150,000cfs threshold which can be revisited in the future work recommended under a WCM update.</li> </ul>	Steve Verigin, David Ford, Dustin Jones	Not Adopted	8/28/2020	The Task 2 Report provides information regarding the AEP of a 150,000 cfs discharge under different operational conditions. The IRB believes that addressing this recommendation would not substantively alter the findings/conclusions/recommendations of the CNA Study and can be deferred to the revisions to the Water Control Manual.
M02-06	The IRB recommends that alternative measures be considered to create artificial power demand to allow energy dissipation so that the grid demand will not be the limiting factor for powerhouse outlet capacity during a flood event.	Concur. <ul style="list-style-type: none"> <li>Internal DWR discussions are ongoing.</li> </ul>	Dustin Jones	Closed	3/15/2019	This recommendation has been considered by DWR staff. The conclusion is that there is not currently a known technology that could locally absorb the electricity produced in the process of making large releases through the Hyatt powerhouse.
M02-07	The IRB recommends that DWR assess the adequacy of the previously completed FCO headworks stability analyses in light of the revised flood routing of the 2018 PMF study.	Concur. <ul style="list-style-type: none"> <li>Task 3 will consider all previous analyses.</li> <li>Previously conducted FCO structural analysis have been considered by the Task 3 Team during the existing conditions assessment and measure development.</li> <li>Updated numerical analysis of the FCO for all loaded cases began in response to the 2014 Part 12D report and is ongoing. The analysis results will not be available until after completion of the CNA project.</li> <li>Task 3 FCO headworks measures have been developed with the knowledge of available structural analyses by incorporation into the CNA SQRA.</li> </ul>	Steve Verigin, David Sarkisian Bob Filgas	Not Adopted	5/22/2020	Studies for the FERC Part 12D study which address this issue will not be completed in time for the CNA Study to incorporate these results. The IRB believes that the team has taken a reasonable approach by assuming a potential need for modification.
M02-08	The IRB recommends that DWR develop a written plan (to be included in the documentation of the analysis) for validation of the model to be used in the non-linear analysis of the FCO headworks and the results of the analysis.	Concur. <ul style="list-style-type: none"> <li>This work will be performed as Part 12D recommendation response.</li> <li>Non-linear analysis is in progress but final results will not be available until after completion of the CNA project.</li> <li>Non-linear analysis is outside the scope of the CNA and approach and details of the analysis are unknown to the CNA team.</li> </ul>	Steve Verigin David Sarkisian Bob Filgas	Closed	5/22/2020	The Taxk 3 report documents the performance based testing that has recently been performed at the FCO. The resonant frequencies developed from that testing should prove very effective in determining whether or not the model of the FCO headworks can accurately match the measured performance data. Since the work is being performed as part of the Part 12D analysis, the IRB considers the recommendation closed.

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M02-09	The IRB recommends that DWR develop a written plan for assessing the performance of the mechanical/electrical components of the FCO headworks under seismic loads.	Concur. <ul style="list-style-type: none"> <li>This will be completed under Task 3.</li> <li>A Seismic Walkdown has been completed a draft report is being prepared.</li> <li>Seismic walkdown documentation is included in the Task 4 report and in the CEII Project Report. Please see response to IRB Comment M01-11 for references.</li> </ul>	David Sarkisian	Closed	8/28/2020	The recommendation in the CEII Project Report for interim risk reduction actions specifically addresses the 2019 seismic walk down inspection.
M02-10	The IRB recommends that the Team embrace a holistic approach and consider other issues that may not have been brought up by the FERC Part 12D process.	Concur. Will be included in Task 1-6 technical work and in Part 12D PFMA/FERC Level 2 Risk Analysis Workshop. <ul style="list-style-type: none"> <li>The CNA existing conditions assessment expanded on the PFMs considered by the L2RA and included non-dam-failure scenarios in the assessment.</li> </ul>	Sergio Escobar	Closed	2/28/2020	The IRB believes that DWR has made a reasonable effort to broadly characterize potential risks at the dam.
M02-11	The IRB recommends that the Team take advantage of the new findings about the characteristics of the embankment zones and consider further implications on the overall stability of the dam, keeping an open mind about uncertainty in the various aspects of the evaluation, including the strength of the embankment materials in the vegetated area and other zones of the dam.	Concur. <ul style="list-style-type: none"> <li>This work will be performed as Part 12D recommendation response and utilized in Task 5.</li> <li>Updated, recently compiled construction information, and recently completed filter, seepage, and slope stability analyses being conducted as part of the Part 12D response has been presented to both the FERC PFMA/Level 2 risk analysis and to the CNA Task 5 team.</li> <li>This IRB recommendation is addressed in the CEII Project Report Chapter 11, Section 11.6, Table 32, recommended Engineering Analysis; T5-033, T5-035, T5-038</li> </ul>	Tim Wehling, Daniel Cimini	Closed	8/28/2020	The IRB believes the future studies identified in Table 32 adequately address this recommendation.
M02-12	The IRB recommends taking advantage of information on the recorded performance of the embankment during significant events in the life of the dam to provide further understanding of the dam's characteristics.	Concur. <ul style="list-style-type: none"> <li>This work will be performed as Part 12D recommendation response and utilized in Task 5.</li> <li>Detailed information on performance of dam during construction, first filling, Core Block cracking, 1975 Earthquake, and performance over time presented to Independent Evaluation Team during Level 2 Risk Analysis in January 2019.</li> <li>This work was also utilized by the CNA Task 5 Embankments Team in estimating dam safety risks for the Embankments under Existing Conditions and for estimating residual risks for the "With Project" condition for various Measures and Alternative Plans. In addition to the specific events previously mentioned, the recent studies completed in the last year or two regarding Materials Summary Database, Investigation of the Vegetated Area (Green Spot), Seepage Analyses, Slope Stability Analyses, Effects of Precipitation on Seepage Monitoring, and Filter Analyses were used. This performance history and the various engineering reports will be documented in the Potential Failure Mode analyses developed for the embankments that are appended to the Task 5 Embankments Report and in the report itself.</li> </ul>	Tim Wehling, Daniel Cimini	Closed	2/28/2020	The IRB believes that presentations to date, the identification of potential failure modes and estimating risks has addressed this recommendation.
M02-13	The IRB recommends that the Team thoroughly document their knowledge and understanding of the performance of the dam including explanations for the very low observed seepage, the significance of the vegetated area on the downstream slope of the embankment, and the effectiveness of the internal filtered seepage collection system for dam performance monitoring.	Concur. <ul style="list-style-type: none"> <li>This work will be performed as Part 12D recommendation response and utilized in Task 5.</li> <li>Detailed information on seepage collected in Grout Galleries and D/S Toe, history and reasons for D/S Vegetated Area, and recent Filter Analyses presented and discussed at Level 2 Risk Analysis in January 2019.</li> <li>A reference list of background documents regarding embankment analyses has been included in the Task 5 report.</li> </ul>	Tim Wehling, Daniel Cimini Les Harder	Closed	8/28/2020	The IRB has reviewed the text included in the draft report and considers this recommendation resolved.
M02-14	The IRB recommends that DWR further develop and update the final CNA report and task report outlines for each successive IRB meeting.	Concur. <ul style="list-style-type: none"> <li>Updated report outlines will be presented at IRB meetings.</li> <li>Draft Outline for Task Reports to be presented at IRB Meeting No. 4.</li> </ul>	Rhonda Robins	Closed	3/15/2019	With each of the past two meetings showing significant progress, the IRB believes that this practice has been sufficiently integrated into the project.

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M03-1	The IRB recommends further development of the evaluation framework in the near term to include additional consequences or outcome categories, including beneficial project outcomes.	Concur. <ul style="list-style-type: none"> <li>• Evaluation Criteria and framework now oriented around DWR Asset Management Risk Matrix and to have the following Project Objectives:                             <ol style="list-style-type: none"> <li>1. Maximize Public Safety</li> <li>2. Maximize Regulatory Compliance</li> <li>3. Maximize Flexibility and Reliability for Water Delivery</li> <li>4. Maximize Flexibility and Reliability for Other State Water Project Purposes</li> <li>5. Minimize Financial Impacts</li> </ol> </li> </ul>		Closed	3/15/2019	The IRB believes that the decision to use the Asset Management risk management matrix as the basis for the evaluation criteria addresses the intent of this recommendation.
M03-10	The IRB recommends consideration be given to basing Hyatt Powerplant capacity on seasonally adjusted historical generating unit availability data, and that inflows be seasonally adjusted based on historical monthly inflows.	Concur. <ul style="list-style-type: none"> <li>• We have learned from OFD engineering and operations that five of the six units at Hyatt are generally considered available, and that the assumption that all six units are available may not be appropriate. This is considered anecdotal evidence based on recent performance at Hyatt. For this reason, we have adjusted our outlet capacity model to consider a maximum of 5 units. We have also refined our outlet model to consider winter and summer inflow variations. We plan to use an average of 10,000 cfs for winter months (December through May) and approximately 2,000 cfs for summer months (June through November).</li> </ul>		Closed	3/15/2019	The IRB believes that the proposed action provides a much more realistic perspective for assessing the adequacy of Hyatt powerplant's contribution to evacuation of the reservoir if it became necessary.
M03-11	The IRB recommends that structural considerations be explicitly addressed with respect to allowance for unbalanced operations of the gates.	Concur. <ul style="list-style-type: none"> <li>• Recent linear analyses have indicated overstressing of the piers during some unbalanced loading conditions (e.g. placement of one single bulkhead).</li> <li>• The structural model that is currently in development is designed to evaluate this, among many other, potential failure modes for the FCO Headworks. The load case of unbalanced gate operation, resulting in unbalanced loading on the piers is one of the load cases being considered in the new phase of analysis. This analysis will also include calibration using performance based testing, also recommended by the IRB.</li> <li>• Preliminary results have been presented to the FERC PFMA/Level 2 risk analysis. The results of future analyses will be considered under CNA Task 3. Potential risk reduction measures (e.g. lateral bracing) will be considered as potential Measures for Task 3.</li> <li>• PFM numbers 12, 15, 26, 27, 29, 32, 40 and 42 are scenarios with unbalanced releases. Structural impacts and/or limitations on releases are considered in the risk evaluations.</li> <li>• Concur with IRB assessment comments.</li> <li>• CNA does not include the scope to complete the work described in the IRB comment which is included in the non-linear structural analysis due later in 2020.</li> </ul>	Bob Filgas	Not Adopted	2/28/2020	The IRB understands the complexity of the analysis required and that it could not be made available in time for the CNA Study. The IRB appreciates that early indications from these studies resulted in proposed risk reduction actions anticipating the likely results of the analysis.
M03-12	The IRB recommends that the scope of Task #6 be expanded to include visual monitoring of the performance of the dam.	Concur. <ul style="list-style-type: none"> <li>• Visual monitoring is already part of the informal daily and weekly surveillance by Oroville Field Division staff, and more formally included in quarterly and annual inspections by multiple parties. Training for visual monitoring, including information on pertinent PFMs, is currently provided to DWR personnel.</li> <li>• Potential improvements in visual monitoring, including improved training of personnel, will be considered as part of the potential risk reduction Measures that will be developed under CNA Task 6.</li> <li>• Included in Task 6 Report</li> </ul>	Craig Hall	Closed	8/28/2020	The IRB agrees that visual monitoring is addressed in the Task 6 Report.
M03-2	The IRB recommends that the integration team develop a common and consistently applied terminology and approach to defining and articulating issues (aka problems or needs), objectives, and constraints across the project.	Concur. <ul style="list-style-type: none"> <li>• Task Needs and Measure Development Objectives have been revised to be consistent and clear on their purposes. Will be submitted for review during IRB Meeting No. 4.</li> <li>• Constraints were found to overlap across different Tasks and have been removed from the Task level and collected into one place and labelled as <i>Project Constraints</i>. Will be submitted for review during IRB Meeting No. 4.</li> <li>• A terminology presentation was made at IRB Meeting No. 4 and IRB comments/suggestions were adopted.</li> </ul>	Steve Verigin, Rhonda Robins	Closed	10/17/2019	The IRB has seen evidence in meetings #5 and #6 that the terminology has been refined and standardized across the project.



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M03-3	The IRB recommends that a minimum set of hard constraints be identified as an essential first step to establishing absolute requirements for measuring plan viability.	Concur. <ul style="list-style-type: none"> <li>Constraints were found to overlap across different Tasks and have been removed from the Task level and collected into one place and labelled as <i>Project Constraints</i>. Hard Constraints are identified. Will be submitted for review during IRB Meeting No. 4.</li> </ul>		Closed	3/15/2019	In report #4, the IRB concurred with DWR's approach for addressing project constraints.
M03-4	Where regulatory requirements are uncertain, the IRB recommends that a well-informed assumption and justification for those requirements be articulated and reviewed with the responsible agency(ies) for their comment and concurrence, prior to engaging in measure development.	Concur. <ul style="list-style-type: none"> <li>Meeting regulatory requirements is now identified as one of the five Project Objectives: <i>Maximizing Regulatory Compliance</i> - will also be one of the five Evaluation consequence criteria.</li> <li>Regulatory guidelines now identified as a <i>Soft Constraint</i> in Project Constraints.</li> <li>Project Team will meet with responsible agencies to better define guidelines and objectives of regulatory requirements and agencies before finalizing the development of Measures.</li> <li>Use of common dam safety regulatory requirements such as Maximum Credible Earthquake (MCE) and Probably Maximum Flood (PFM) have been included in the CNA project work.</li> <li>DSOD guidelines for reservoir drawdown are addressed in the Task 4 draft report. These guidelines are not rigid regulatory requirements, especially for very large onstream dams.</li> <li>Please see response to comment no. M07-04 regarding acknowledgement of the benefits of additional low-level outlet capacity.</li> </ul>	Steve Verigin	Closed	5/22/2020	The IRB's interest in this recommendation centered primarily on early discussions of the discussions of the scope of Task 2. From the Task 2 report, it is apparent that DWR has found a path forward.
M03-5	IRB recommends that the Integration Team develop a standard format for the tables of issues, objectives, and constraints that each Task Team can populate using a common terminology and formulation approach.	Concur. <ul style="list-style-type: none"> <li>A standard format and template was developed and individual Task teams populated their tables using consistent terms for Task Needs and Measure Development Objectives. Will be presented at IRB Meeting No. 4.</li> </ul>		Closed	3/15/2019	The Project Integration Team played a key role in adapting individual project team tables to a common format. With the common format being evident during the briefings for meeting #4, the IRB considered this recommendation closed.
M03-6	The IRB recommends that all task names be revised to replace "Alternatives" with "Measures."	Concur. <ul style="list-style-type: none"> <li>Task titles and Needs Statements along with the Measure Development Objectives for all six tasks have been revised. Consistent terminology has been adopted by the Task teams.</li> </ul>		Closed	3/15/2019	Changes were evident to the IRB at meeting #4, and the IRB considered the recommendation closed.
M03-7	The IRB recommends that the title to Task 1 be revised to "Evaluating Measures to Enhance Spillway Reliability and Resiliency".	Noted. <ul style="list-style-type: none"> <li>The Needs statements for all Tasks have been revised to be consistent with each other and with the Project Objectives. The new Needs Statement for Task 1 is as follows: <i>What enhancements or new facilities for the Oroville Dam Spillways are needed to improve safety and reliability ?</i></li> <li>The revised Task Titles/Needs Statements for the six tasks have been submitted to FERC.</li> <li>The revised Needs Statements, Measure Development Objectives, and terminology for all six Tasks will be presented at IRB Meeting No. 4.</li> </ul>		Closed	3/15/2019	Changes were evident to the IRB at meeting #4, and the IRB considered the recommendation closed.

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M03-8	The IRB recommends that the Project Team identify and assess data gaps related to the geology of the affected overflow area from between the secant pile wall and the river, and collect any additional data needed to support the recommendation of measures.	<p>Concur.</p> <ul style="list-style-type: none"> <li>Task 1 has been developing a 3D geologic model of the Emergency Spillway to better understand the subsurface geologic conditions. To develop the geologic model, data collected during the Oroville Spillways Emergency and Recovery efforts (including subsurface geology, surficial geologic mapping, and geophysical profiles) were combined with more recent surficial geologic mapping of the scour channel.</li> <li>While there are still some gaps in the geologic understanding of the hillside between the secant pile wall and the Diversion Pool, the resolution of the geologic model should be sufficient to perform the level of analysis needed to identify, assess, and recommend potential measures. Specifically, the 3D geologic model will be used in conjunction with various hydraulic simulations to perform scour and erosion analysis, which is being guided by scour expert Dr. Michael George (BGC Engineering).</li> <li>An additional site geology and erosion potential study presentation was made at IRB Meeting No. 6.</li> <li>Following the completion of the CNA Project and when specific plans are considered for implementation by DWR, it is likely that additional geologic data will need to be collected for preliminary designs.</li> </ul>	Craig Hall, Stephanie Briggs	Closed	10/17/2019	The IRB believes that the presentation of the emergency spillway erosion analysis at meeting #6 demonstrated a reasonable understanding of the geology downstream of the secant pile wall. DWR has used the best available technology for estimating the amount of erosion that could take place under a variety of flow conditions. While some of the assumptions are simplistic, the IRB believes the analysis to be appropriate for a planning level study once it has been peer reviewed.
M03-9	The IRB recommends that the interaction of the FCO, River Valve Outlet System and Hyatt Powerplant be fully defined to determine whether there is an FCO release level that could potentially incapacitate the Hyatt PP and/or River Valve Outlet System (RVOS) due to excessive tailwater elevation.	<p>Concur.</p> <ul style="list-style-type: none"> <li>The Task 4 team held a meeting with OFD engineering and operations to gain a better understanding of the tailwater elevation influence on the ability to discharge water from the Hyatt PP and the RVOS. A summary of our findings will be presented at IRB Meeting No. 4. In general, Hyatt discharge capacity begins to be reduced when spillway flows reach 22,000 cfs (increasing tailwater elevation to 226.5-feet) and is fully inhibited when spillway flows reach 105,000 cfs (tailwater elevation equals 236.0 feet). The RVOS may only be operated when tailwater elevation is between 223.0-feet and 227.0-feet.</li> </ul>		Closed	7/12/2019	The information provided by DWR has provided a better understanding of the interaction of these critical release facilities. The IRB considers the recommendation closed.
M04-1	The IRB recommends that a clear strategy be developed to determine how CNA preliminary risk assessment work will be checked for consistency with L2RA results prior to completion of the CNA. The strategy should include a process by which adjustments can be made to the CNA, if necessary.	<ul style="list-style-type: none"> <li>Concur: Integration Team has developed a process to coordinate results of CNA Existing Conditions Assessment with L2RA. Process has been rolled out to CNA Task Leaders who are checking CNA results with available L2RA results.</li> <li>The CNA Integration Team met with the L2RA project leaders and agreed to a process for comparing results, especially for any PFMs with large differences (outliers) between the two projects. Results of the comparisons will be documented in the CNA final report.</li> </ul>	Sergio Escobar	Closed	10/17/2019	The IRB was briefed during meeting #5 on the process for comparing results between the CNA and the Level 2 risk analysis. The project team provided a comparison of results for one task which showed reasonable agreement for most PFMs. Project integration team members indicated that there were several PFMs where additional work was required to understand the differences in portrayal of risk. Based on information provided in presentations for meeting #6, the IRB is satisfied that this process is in place.
M04-2	The IRB recommends that a process is developed to ensure that the initial screening of PFMs is done in a consistent manner across all tasks.	Concur: Integration Team developed process that is being used by CNA Task Leads	Rhonda Robins	Closed	7/12/2019	During meeting #5, the project team presented a process that appeared reasonable to the IRB.
M04-3	The IRB recommends that a process be developed to ensure that the screening of risk reduction measures is done in a consistent manner across all tasks.	<ul style="list-style-type: none"> <li>Concur: Integration Team developed process that is being used by CNA Task teams to consistently incorporate risk reduction into the development of project measures.</li> <li>Risk reduction (measures development) screening processes were presented at IRB Meeting No. 6.</li> </ul>	Sergio Escobar	Closed	10/17/2019	Presentations for meeting #6 demonstrated a consistent process for screening of risk reduction measures.
M04-4	The IRB recommends that DWR consider preparation of a parallel final report based on non-critical energy infrastructure information (CEII) which could be released to the public without the need for redaction.	<ul style="list-style-type: none"> <li>Concur: A report will be prepared without CEII that can be publicly shared.</li> <li>Concur. The non-CEII version of the project-level report is being informed by and modeled on the CEII version, which is in progress.</li> <li>Public Report has been issued to IRB for review.</li> </ul>	Rhonda Robins	Closed	8/28/2020	The IRB has reviewed the Public version of the report and considers this recommendation closed.

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M05-1	The IRB recommends that a record be kept of the 245 PFMs that were not carried forward along with an explanation of why each PFM was ruled out.	<ul style="list-style-type: none"> <li>Presentations of the PFMs and measures that were not carried forward were presented at IRB Meeting No. 6 and will be documented in the Task Level and CNA Final reports.</li> </ul>		Closed	10/17/2019	Materials provided for meeting #6 have provided documentation of the all failure modes identified and the rationale for those that were not fully developed.
M05-2	The IRB recommends that the CNA Study Team develop a process to incorporate consideration of uncertainty in the selection of risk reduction measures.	<ul style="list-style-type: none"> <li>Concur. Process uncertainties will be addressed in the Final Report.</li> </ul>	Steve Verigin, Les Harder, Rhonda Robins	Closed	2/28/2020	The IRB believes that approach of including measures for potential risks at least two orders of magnitude below what is commonly accepted as acceptable risk, DWR has adequately addressed the uncertainties inherent in risk assessment.
M05-3	The IRB recommends that the non-linear model for the FCO headworks structure be used to also assess the stresses and strains for both balanced and unbalanced loads associated with the probable maximum flood.	<ul style="list-style-type: none"> <li>The non-linear structural analysis of the FCO will not be completed until the first part of next year, 2020. It will not be available for risk reduction measures or alternative plans development. It will be listed as a "future study" and will be used to augment the recommendations of the CNA Report.</li> <li>The non-linear structural analysis including normal, flood, and seismic loading conditions is scheduled for completion later in 2020.</li> </ul>	Bob Filgas	Not Adopted	2/28/2020	The IRB understands the complexity of the analysis required and that it could not be made available in time for the CNA Study. The IRB appreciates that early indications from these studies resulted in proposed risk reduction actions anticipating the likely results of the analysis.
M05-4	The IRB recommends that DWR consider installing two (as a pair) additional piezometers some tens of feet to the right of proposed piezometers P-200A and P-200B, along the road at elevation 350 and within the footprint of the river channel, to measure water levels below Zone 5A upstream of the seepage barrier.	<ul style="list-style-type: none"> <li>Concur. Adopted and included in piezometer construction plans.</li> </ul>	Les Harder	Closed	10/17/2019	Based on the statements made at the Ad Hoc meeting on 10/16/2019, the IRB understands that the recommendation will be implemented.
M05-5	The IRB recommends that the definitions of "direct" and "indirect" costs used for CNA purposes be revisited.		4 Sergio Escobar	Not Adopted	8/28/2020	While the IRB continues to believe that a planning study for a dam of such national significance as Oroville Dam should also account for secondary economic impacts to the nation in accordance with the Principles, Requirements and Guidelines, we also understand that the State of California has its own criteria for water resources planning studies. The net difference in effect is likely negligible as the additional economic impacts are unlikely to change by an order of magnitude.
M06-1	The IRB recommends that the reference to the "four Rs of a resilient system," be reviewed in context of IRB Recommendation 1-6 (see IRB Report No. 1).	<ul style="list-style-type: none"> <li>The project team has used USACE's most recent update on resilience, "Engineering and Construction Bulletin No. 2018-2" January 25, 2019 for evaluation of task measures and the alternative plans. Documentation is provided in the draft task reports and alternative plan presentations for IRB Meeting No. 7.</li> </ul>		Closed	2/28/2020	The draft task reports provided clearly address the elements of resilience.
M06-2	The IRB recommends that each appendix providing the detailed justification for the screening of measures be reviewed and edited to ensure that justifications are clear, well-documented, and use of terminology is consistent among Task Teams.	<ul style="list-style-type: none"> <li>The Integration Team is performing and documenting/editing and performing QC of the PFM documents and task reports.</li> <li>Included in Task Reports.</li> </ul>	Rhonda/Int Team	Closed	8/28/2020	The IRB believes this has been accomplished for all tasks.
M06-3	The IRB recommends that the potential for emergency intervention be considered and included in the evaluation of risk reduction measures, and discussed in the reports for each task.	<ul style="list-style-type: none"> <li>Intervention has been included as appropriate in some PFM evaluations.</li> </ul>	Rhonda/Int Team	Closed	5/22/2020	The IRB believes this has been addressed in the appropriate failure modes.
M06-4	The IRB recommends that consideration be given to a measure for a single low-level outlet that would provide both FCO redundancy and Hyatt Powerplant outlet redundancy, rather than two separate outlets.	<ul style="list-style-type: none"> <li>Concur. The consideration of a dual-purpose, low-level outlet is included in the alternative plan formulations.</li> </ul>	Steve Verigin	Closed	2/28/2020	

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M06-5	The IRB recommends that DWR ensure that each supporting analysis be peer reviewed prior to considering it finished or complete.	<ul style="list-style-type: none"> <li>Peer review of technical work performed at the task-level is underway.</li> <li>The technical analysis performed in support of the risk assessments have been documented in DWR Technical Memorandum format and independently quality controlled reviewed by the Integration Team or other selected senior staff from DWR or its consultants.</li> </ul>	Steve Verigin	Closed	8/28/2020	The IRB believes that the document preparation page in each report addresses this recommendation.
M06-6	The IRB recommends that a similar distinction be made with the red cells, especially since all four of the PFMs that are within the red matrix fall along the peripheral of the amber cells, and are marginally in the red.	<ul style="list-style-type: none"> <li>Concur. This concept has been adopted and included in a revised risk matrix.</li> </ul>	Les Harder	Closed	2/28/2020	The requested changes have been incorporated in the draft reports.
M07-1	The IRB recommends that the CNA Project Team discuss the issue of uncertainty in the likelihood and consequence estimates in the CNA Project Report and consider the need to portray uncertainty in graphical representations of the estimates.	A discussion of uncertainty of PFM semi-quantitative risk assessments has been included in the CEII version of the Project and report and a presentation was provided at IRB Meeting No. 8.	Les Harder	Closed	5/22/2020	The IRB agrees that uncertainty in the risk estimates has been addressed in section 6.8.3 of the CEII Project Report.
M07-10	The IRB recommends that the CNA Project Report acknowledge the potential for climate change to influence residual risks and the effectiveness of the measures being considered and discuss how those influences may be accounted for in the future.	Concur. Discussion of climate change and the evaluation of potential future facilities and reservoir operations are included in the CEII project report and Task 2 report. Technical evaluations of climate change impacts will be included in the ongoing work of FIRO and future work in re-evaluation of the 1970 Water Control Manual.	Dustin / Steve	Closed	5/22/2020	The IRB agrees that the issue of climate change has been addressed in the Task 2 Report. It is also briefly addressed in sections 10.2.1 and 10.5.1 of the Project Report. Section 10.7 of the CEII Project Report makes the appropriate connection with resiliency.
M07-2	The IRB recommends that the CNA Project Team examine the differences between L2RA and CNA estimates further and determine if there are systemic reasons for these differences.	Comparison of the L2RA and CNA risk assessments is provided in each of the task reports and an extensive presentation was provided at IRB Meeting No. 8.	Les	Closed	5/22/2020	The IRB agrees that the comparison has been made in the task report and summarized in the Project Report. The IRB followed up on this recommendation in Meeting #8 with a recommendation for graphically presenting the comparison.
M07-3	The IRB recommends that the report prepared for the public include a brief discussion of how risk is quantified and when and how it is determined to be tolerable.	<ul style="list-style-type: none"> <li>Concur. These discussions will be included in the Public Report and are included in the draft of the CEII Project Report.</li> <li>Public Report submitted to IRB for review.</li> </ul>	Les	Closed	8/28/2020	The IRB agrees that this is discussed in the CEII Project Report and the public version of that report.
M07-4	The IRB recommends that a discussion of the low level outlet capacity providing a capability to intervene in other failure modes to reduce the likelihood of an uncontrolled release of the reservoir, be included in the Executive Summary and Section 2.0 of the Task 4 Report. Such a discussion would establish the basis for the addition of low level outlet capacity enhancements discussed in Section 6.5.	<p>Discussions of the benefits of additional low-level outlet capacity are provided in the Task 4 Report and the CEII Project Report. There is currently no dam safety deficiency identified with respect to low-level outlet capacity however, the CNA Team acknowledges the benefits and risk reduction capabilities of enhancements to the existing low-level outlet facilities.</p> <p>Concur-text is included in both the CEII Project Report and Task 4 Report.</p>	Chris / Steve	Closed	8/28/2020	Section 7.2.3 of the CEII Project Report mentions low-level outlets in the context of Task 4. While the structures that would provide the capability to drain the lower portion of the reservoir may fit within the scope of Task 4, reservoir evacuation is an issue that is integral to many of the failure modes in other tasks. Although it may not be a "deficiency" in regulatory terms, it is a key element of understanding risk. The IRB agrees that the report language has been adjusted to provide appropriate coverage of this topic and considers the recommendation closed.
M07-5	The IRB recommends that Task 4 consider the issue of personnel safety for Hyatt Power Plant in lesser seismic events where rockfalls do not result in physical damage.	<p>DWR maintains standard operating procedures for post-earthquake seismic inspections with regard to facility functionality and personnel safety.</p> <ul style="list-style-type: none"> <li>The Integration Team and Task 4 Team discussed this recommendation and confirmed that DWR maintains SOPs for this purpose.</li> </ul>	Chris / Les	Closed	8/28/2020	While SOPs exist to address the requirements and procedures for re-entry, they do not address the potential for financial loss during the time in which it might take to gain re-entry to the plant. However, the financial consequences may not be significant and the IRB considers the recommendation closed.
M07-6	The IRB recommends that the Task 5 Report make reference to the study of the vegetated area and other studies of the dam completed by DWR in the description of existing conditions, and where the studies were used to inform the development of PFMs and risk estimates.	The Task 5 report as well as the Task 1, 2, 3, 4 and 6 reports include reference lists of documents providing background to the CNA existing conditions. Many of the PFM documents in the Task report appendices also reference background documents.	Tim / Daniel	Closed	5/22/2020	The IRB believes that the Task 5 reference DWR. 2018c. is intended to address this recommendation.

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M07-7	The IRB recommends that the hydraulic conditions leading to an elevated reservoir level near the Parish Camp Saddle Dam during extreme hydrologic events that contribute to the risk of overtopping of that dam be discussed in Section 5.3 of the Task 5 Report.	Concur. This information was added to Section 5.3.	Tim, Daniel	Closed	5/22/2020	The IRB concurs that this recommendation has been addressed in the reports.
M07-8	The IRB recommends the full suite of alternative plans be presented as appropriate for consideration by DWR management.	Concur. All plans are included in the CEII project report.	Rhonda	Closed	5/22/2020	The IRB Concur that all of the plans have been included in the CEII Project Report.
M07-9	The IRB recommends that DWR management consider expedited implementation of low cost measures where the cost of further studies could equal or exceed the cost of implementation.	Concur. Several interim implementation projects: raise Parish Camp Saddle Dam, line Palermo Canal, and provide backup radial gate hoist power are included in the CEII project report and presented as recommendations at IRB Meeting No. 8.	Sergio	Closed	5/22/2020	The IRB Concur that all of the recommended interim implementation projects have been addressed in section 10.5 of the CEII Project Report.
M08-1	The IRB recommends a discussion be provided in the project report explaining the final screening of the recommended task report measures from 33 measures to 22 measures.	Concur. Additional text was added in different sections in Chapter 9 describing at what point and why the 11 measures were either dropped or combined when considering them in the formulation and evaluation of Alternative Plans (e.g. see Section 9.4.3). In addition, a new table was added - Table 26: <i>Tracing the 33 Measures Recommended by CNA Task Teams for Plan Formulation</i> (Pages 180 - 184). This table is at the end of Chapter 9 and documents the disposition of each of the 33 measures recommended for plan formulation by the task teams, including which plans incorporated the measures carried forward (22 measures), and which measures were dropped (8 measures) and why, and which measures were combined into one single measure (4 measures) for a net reduction of 11 measures from those originally recommended by the Task Teams for consideration..	Les	Closed	8/7/2020	The IRB Concur that this recommendation has been addressed.
M08-2	The IRB recommends that the language of the findings in the reports be modified to be more risk informed.	Concur. The principal finding was modified using language from FERC guidance documents together with two sentences suggested by the IRB Meeting No. 8 report on Page 4. The modified language appears in both the Executive Summary and Summary of Conclusions and Recommendations in both the CEII CNA Project Report and in the CNA Public Release Report.	Les	Closed	8/7/2020	The IRB Concur that this recommendation has been addressed.
M08-3	The IRB recommends that discussion and a specific finding be included to address the reservoir evacuation capability for Oroville Dam.	Concur. Substantial additional discussion and findings were added with regard to reservoir evacuation capabilities in both the section on Dam Safety Findings and System Reliability Findings in both the Executive Summary and in Chapter 11 in the CEII CNA Project Report. A summary point on this is also added to the CNA Public Release Report. Additional new discussion was also added on this subject to the Task 4 Report.	Les	Closed	8/7/2020	The IRB Concur that this recommendation has been addressed.
M08-4	The IRB recommends that Table 2 in the Executive Summary of the Project CEII Report be enhanced to include a column that indicates the feature of the project each measure pertains to with better descriptions for some measures.	Concur. This was completed by adding this information into Column 3 of Table 2.	Les	Closed	8/7/2020	The IRB Concur that this recommendation has been addressed.

Comments and Recommendations / Independent Review Board

Updated 8/30/2020

Oroville Comprehensive Needs Assessment Project

FINAL

Comment No.	IRB Comments/Recommendations	CNA Project-Level Action to Address the Recommendation	Responsible Lead	IRB Status Assessment	Date Closed	IRB Assessment Comments
M08-5	The IRB recommends that a comparison between the CNA and L2RA estimated annual probabilities for PFMs common to both studies be presented graphically in each of the task reports and the project report.	Concur. This was completed by adding a graphical summary of the likelihood estimates for all 96 CNA PFMs that could be compared to similar results developed by the L2RA process - this was for all 4 Task Teams which developed PFM likelihood estimates (Tasks 1, 3, 4, and 5). This graph now appears as Figure 35 on Page 132 of the CEII CNA Project Report. In addition, a summary table was also provided as Table 15, also on Page 132, which summarizes the results shown in the graph. A similar graphical summary for each Task Team's set of PFMs was provided in each of the four Task Team reports where PFMs were developed.	Les	Closed	8/7/2020	The IRB Concur that this recommendation has been addressed.
M09-1	The IRB recommends that a review be performed to refine DWR's process for assessing, evaluating, and making decisions regarding actions to be taken to address anomalies identified in the project monitoring data.	Concur. Sections 1.7, 1.9, and 8.7 of the CNA Task 6 report were revised to describe processes that should be used respond to situations where performance monitoring instrumentation or observations exceed Threshold or Action Levels. These sections also refer to a DWR O&M Guidance/Procedure memorandum being developed to establish statewide procedures for responses to performance monitoring exceedances, including actions, investigations, communications to management, and documentation. These revised sections in the Task 6 report now also call for a formal review of existing and proposed procedures prior to finalizing the Guidance/Procedure document.		Closed	8/28/2020	The IRB agrees that the revisions to the Task 6 report have addressed this recommendation.