FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Dam Safety and Inspections - Headquarters Office
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February 13, 2017

In reply refer to:
P-2100

Mr. William Croyle
Acting Director
California Department of Water Resources
P.O. Box 942836
Sacramento, California, 94236-0001

Re: Emergency Repair and Board of Consultants for Oroville Dam Spillway

Dear Mr. Croyle:

Major damage occurred to the Oroville Dam Service Spillway during spillway operation on February 7, 2017. This event and subsequent operations have led to the loss of a significant portion of the spillway chute, and has reduced the amount of available spillway capacity at the project. Ongoing service spillway operations may continue to lead to additional damage to the service spillway. Additionally, due to high inflows and reduced service spillway capacity, the ungated emergency spillway saw overtopping flow beginning on February 11, 2017, for the first time which resulted in excessive erosion threatening the stability of the structure on February 12, 2017. Due to the magnitude of this event and the potential for additional issues, we are requiring California Department of Water Resources (DWR) to initiate immediate design of emergency repair to minimize further degradation of both the emergency spillway and the service spillway. In addition, DWR shall convene an Independent Board of Consultants (BOC).

The BOC shall review and assess the:

1. Current measures being implemented at the project to pass inflows.
2. Current condition of the service spillway and adjacent areas of the project.
3. Current condition and capability of the Emergency Spillway to safely pass flood flows.
4. Risk reduction measures currently implemented and any additional risk reduction measures proposed.

5. Measures to keep the Powerhouse operable during the short-term and long-term.
6. All proposed remedial options for the service spillway.
7. All proposed remedial options for the emergency spillway.
8. Long-term, permanent modifications and project operations.
9. Any additional information or analysis requested by the BOC.

In addition, DWR shall perform a forensic analysis aimed at determining the cause of the chute failure and ascertaining if the failure mode could occur again. The forensic analysis must be performed by a fully independent third party with no previous involvement in assessing the spillway structure at this project. The BOC shall also be tasked to review and comment on this analysis.

Effort must be focused on emergency repair and risk reduction actions in the short term. The forensic analysis can not be allowed to interfere with or detract from the design of emergency repair or proposed risk reduction actions. However the forensic analysis must be performed.

The BOC shall review and assess all aspects of the forensic analysis to include:

1. Review of the plan of action describing the steps that will be undertaken for the forensic analysis, to include an analysis of the root cause and contributing causes of the spillway damage.

2. Project operations, before, during and after the event.

3. A thorough review of project documents, including the emergency action plans, Potential Failure Mode Analyses, Part 12D Independent Consultant Inspection Reports and the Supporting Technical Information Documents, should be included in the analysis. This review should include an assessment of how extreme flood flows are passed at Oroville Dam.

4. Any additional information or analysis requested by the BOC.

The BOC is to consist of at least 5 members with experience that covers the following engineering disciplines: structural engineering (with specialization in concrete spillway structures), spillway hydraulics, engineering geology, geotechnical engineering, and civil engineering with extensive experience in dam design, construction and operation. By letter, a copy of each proposed Board member's resume is to be submitted to the Acting Director, Division of Dam Safety and Inspections (D2SI) for review and approval, and two copies submitted to the D2SI-San Francisco Regional Engineer.

Due to the urgency to complete assessment and manage the current situation through the Spring, we will allow some flexibility on the requirements that follow. The operation of

each BOC will normally be as follows:

1. There will be formal meetings of the BOC scheduled to review the technical areas the BOC is required to assess. The meetings should be scheduled at important milestones for the investigations and design and construction of remediations. It is anticipated that the meetings will be attended by members of the BOC, DWR, DWR's engineering consultants, and FERC.

   The BOC should convene their first meeting as soon as possible to provide any potential input into the forensic analysis.

2. At least two weeks prior to each BOC meeting, DWR shall provide to the distribution list below a data package that contains:

   a) An agenda for the meeting;
   b) A statement of the specific level of review the BOC is expected to provide;
   c) A list of the items to be reviewed and discussed with the BOC;
   d) Investigations, engineering analyses, reports, and design drawings and specifications to be reviewed by the BOC; and
   e) A discussion of significant events in the investigation that have occurred since the last BOC meeting.

   The data package, as well as all project related correspondence, should be distributed as follows:

   a) One copy to each BOC member;
   b) Three copies to the D2SI-San Francisco Regional Engineer; and
   c) Three copies to the Acting Director, D2SI, Washington DC

3. At the end of each BOC meeting, the BOC shall verbally present their conclusions and recommendations and provide DWR a copy of the BOC meeting report. An electronic copy of the report should also be included.

4. Within 15 days after each BOC meeting, DWR must submit to the Acting Director, D2SI, and to the D2SI-San Francisco Regional Engineer three copies of a plan and schedule to comply with the BOC's recommendations or a statement identifying a plan to resolve any issue(s). In the event the BOC's recommendations are not implemented, detailed reasons for not doing so should be provided. We may require additional action after we review the above information.

5. A summary of all the BOC's recommendations is to be maintained in a periodic status report folder, indicating the BOC report in which the recommendation was made, and including the current status and outcome of each recommendation.

6. The BOC shall remain in effect through the design and construction of any required remediation.

7. The final BOC meeting is to be held one year after implementation of operational changes and completion of construction of any required remediation. The final BOC report shall assess the operation of the project and if the project is performing as intended based on the engineering investigations, design report, construction reports and instrumentation performance. Within 45 days of the date of the final BOC report, three copies are to be submitted to the Acting Director, D2SI, and the D2SI-San Francisco Regional Engineer.

You must submit resumes for your proposed BOC members and your proposed forensic team, and a plan and schedule for the required actions as soon as possible, but not later than 5 days of this letter. Please contact me with any questions.

Sincerely,

David E. Capka, PE
Acting Director, Division of Dam Safety
and Inspections

cc:
Mr. David Panec
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