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February 21, 2023

**VIA ELECTRONIC FILING**

Kimberly D. Bose  
Secretary, Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

Douglas L. Johnson, P.E.,  
Regional Engineer, FERC-PRO  
805 SW Broadway, Suite 550  
Portland, OR 97205

**Re: Lower Klamath Project Independent Board of Consultants' Approval of Final Construction Documents; Lower Klamath Project, FERC Project No. 14803-001**

Dear Secretary Bose and Mr. Johnson:

On behalf of the co-licensees and in compliance with Ordering Paragraph (O) of the License Surrender Order (LSO),<sup>1</sup> the Klamath River Renewal Corporation (Renewal Corporation) encloses the Lower Klamath Project Independent Board of Consultants' final review and approval of the final construction documents (Final Design).<sup>2</sup> Please see **Attachment A**. With this filing, the Renewal Corporation has now fulfilled all of the requirements of Ordering Paragraph (O) of the LSO and respectfully renews its request for the Commission's expedited approval of the Final Design.

To facilitate our preparation for the Pre-Drawdown work activities at the dams in mid-summer, the Renewal Corporation hereby renews its request for the Commission's approval to proceed with the following activities in advance of approval of the full construction package, if possible, on or before March 1, 2023:

- Mobilization of the contractor's crew and equipment to the Iron Gate, Copco No. 1 and Copco No. 2 sites;
- Site clearing and preparation of the staging, laydown, and office areas at Copco No. 1, Copco No. 2, and Iron Gate Dam sites;
- Setting up a temporary work camp at the Copco No. 2 village;

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<sup>1</sup> 181 FERC ¶ 61,122 (Nov. 2022). Ordering Paragraph (O) requires a statement from the Board that the final design documents adequately address its previous comments and that the Board is in agreement with the final design documents.

<sup>2</sup> The Renewal Corporation filed its Final Design on January 13, 2023. FERC accession nos. 21230113-5272; 2123017-5030 and 2123017-5031.

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- Installation of temporary bridge supports on existing bridges on Copco and Dry Creek Roads;
- Clearing and site preparation for the new Yreka Pipeline and Daggett Bridge;
- Temporary power installation; and
- Modification to the existing Copco No. 1 powerhouse access road to widen and construct safety improvements.

The co-licensees appreciate the Commission's oversight and guidance as we implement the LSO. If the Commission requires any additional information with respect to the foregoing, please let us know.

Respectfully submitted,

*s/ Markham A. Quehrn*

Markham A. Quehrn  
Perkins Coie LLP  
Attorney for Klamath River Renewal  
Corporation

*s/ Richard Roos-Collins*

Richard Roos-Collins  
General Counsel, Klamath River Renewal  
Corporation

*Attachment A: Letter Report; Board of Consultants – Final Design Submittal Lower Klamath Project (FERC Nos. P-2082, P-14803) Klamath River Renewal Corporation (February 16, 2023).*

cc: Lower Klamath Project Board of Consultants  
Mort McMillen (McMillen Company)  
Kevin Takei (California)  
Anika Marriott (Oregon)  
Dustin Till (PacifiCorp)  
Olivia Mahony (Renewal Corporation)

**Attachment A:**

*Letter Report; Board of Consultants – Final Design Submittal Lower Klamath Project (FERC Nos. P-2082, P-14803) Klamath River Renewal Corporation (February 16, 2023)*

**Board of Consultants****Lower Klamath Project**

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Mr. Mark Bransom  
Klamath River Renewal Corporation  
2001 Addison Street, Suite 317  
Berkeley, CA 94704

**Date: February 16, 2023**

**Re: Letter Report; Board of Consultants – Final Design Submittal  
Lower Klamath Project (FERC Nos. P-2082, P-14803)  
Klamath River Renewal Corporation**

Dear Mr. Bransom,

The Independent Board of Consultants for the review of the Lower Klamath River Renewal Project respectively submits the following Letter Report, regarding our Final Review and Approval of the Final Construction Documents.

## **INTRODUCTION**

The Lower Klamath Project Independent Board of Consultants (BOC) received the Final Design Submittal as outlined in this Letter Report, on January 13, 2023. The Final Design Submittal was received by the BOC concurrently with FERC, with the intent of compliance with the Commission's direction in LSO Ordering Paragraph O, requiring BOC review and approval.

The BOC's Letter Report; Board of Consultants Meeting No. 4, dated September 30, 2022 provided the BOC's final review comments regarding the Klamath River Renewal Corporation (Renewal Corporation) June 22 Final Construction Documents (Final Construction Documents) submitted to the Federal Energy Regulatory Commission (FERC or Commission) on June 29, 2022. The Final Design Submittal for the safe removal of four dams and the restoration of volitional fish passage on the Lower Klamath River was prepared in support of the *Amended Application for Surrender of License for Major Project and Removal of Project Works*, FERC Nos. 14803-001, 2082-063 ("Amended Surrender Application").

Subsequent to our Letter Report of September 30, 2022, and included with transmission of the Final Design Submittal, the BOC has received *Renewal Corporation Response to FERC Board of Consultants (BOC) Letter Report No. 4*.

## REVIEW DOCUMENTS

As part of the BOC's Final Document Review, the Renewal Corporation provided the BOC with the following documents on January 13, 2023. The BOC has focused its review on the Renewal Corporation's specific responses (part of Exhibit O) to concerns and recommendations in our Letter Report of September 30, 2022, as well as design changes and improvements delineated in Table 1, Exhibit P, Final Revision Log.

- Exhibit A - Construction Plans, Tech Specs, and Design Report
- Exhibit C – Final Dam Removal Erosion & Sediment Control Plans
- Exhibit D – 60% Reservoir Restoration Construction Plans and Design Report
- Exhibit E – Quality Control Inspection Program (QCIP)
- Exhibit F – Temporary Construction Surveillance & Monitoring Plan
- Exhibit H – Temporary Construction Emergency Action Plan (TCEAP)
- Exhibit I – Project and Construction Schedule
- Exhibit J – Daggett Bridge Construction Drawings, Tech Specs, and Design Report
- Exhibit K – City of Yreka Permanent Water Pipeline Relocation Construction Plans, Tech Specs, and Design Report.
- Exhibit L – Fire Management Ramps and Dry Hydrants Construction Plans
- Exhibit N – Public Safety Plan
- Exhibit O – Response to Comments (BOC, FERC, DSOD)
- Exhibit P – Revision Log
- Renewal Corporation Letter dated January 13, 2023, Klamath River Renewal Corporation's January 2023 Final Decommissioning Design Submittal and Information Regarding BOC Review; Lower Klamath Project, FERC Project No. 14803-001
- Renewal Corporation Response to FERC Board of Consultants (BOC) Letter Report No. 5., dated January 13, 2023
- Knight Piesold Memorandum dated December 21, 2022, *Iron Gate Diversion Tunnel – Key Features in Hydraulic Design for Drawdown*

## UNDERSTANDING OF THE ASSIGNMENT

In accordance with the FERC's May 2018 directive and Section 14.3.7 of the 2017 FERC's 2017 *Energy Guidelines for the Evaluation of Hydropower Projects*, the BOC has conducted its evaluation of the Final Construction Documents as a final review of content. It is the BOC's understanding that BOC final review is required prior to construction activities, currently scheduled to begin mid-March 2023. The BOC has conducted its review consistent with the requirements outlined in FERC's letter of Board of Consultants Approval, dated May 22, 2018.

## CONCLUSION

The BOC concludes that the Final Design Submittal and Final Construction Documents are satisfactory and ready for the start of construction.

To that end, the BOC makes the following comments:

1. The BOC expects to be informed during the course of planning and construction, particularly regarding matters of concerns raised by the BOC and BOC recommendations. This would include BOC receipt of Monthly FERC Reports, Quarterly BOC meetings Scheduled, and BOC updates before critical work activities, as called for in the Final TCSMP, FERC Letter of May 22, 2018, and other documents.
2. The BOC appreciates the open communication and the level of effort put forth in order to address BOC questions, concerns, and recommendations.
3. Regrettably, BOC member James Borg has had to retire and subsequently resigned from the BOC. This leaves the BOC without his expertise in hydraulics and hydrology. While the BOC looks forward to Renewal Corporation presenting a replacement BOC member with this expertise to the FERC, BOC members Dan Hertel and Dr. Craig Findlay have reviewed the referenced documents with regard to hydraulic and hydrologic content and are comfortable with the review results at this stage and concur with the final package being submitted to FERC as discussed herein. The BOC looks forward to input from the anticipated new BOC expert at such time as their review is possible. Ideally, this input would be prior to or concurrent with certain pre-drawdown activities, including testing of the gate and tunnel improvements at Iron Gate Dam so that the new BOC member's pertinent comments and opinions can be considered by the Renewal Corporation and design team in a timely manner. The BOC does not believe this review needs to occur prior to mobilization or other non-dam related early work
4. Appropriately, the BOC addresses each of the Renewal Corporation's responses of January 13, 2023 for clarity.

**a. Regarding BOC Recommendation No. 1 - Site-Specific Risk Reduction Measures in Temporary Construction Surveillance and Monitoring Plan**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. This response appropriately places responsibility for development of site-specific work plans, contingency plans, and risk reduction measures on the Contractor, with oversight by Renewal Corporation and the Owner's Representative. Appropriately, the TCSMP has been amended and is acceptable. While Site-specific risk reduction measures have been identified, specific activities related to these risk reduction measures are not included in the current construction schedule. However, BOC Coordination, Monthly FERC Construction Reports, Quarterly Risk

Register Updates, and Periodic Key Milestone Updates are shown on the Construction Schedule. The BOC is satisfied that this level of coordination will provide the BOC with adequate means of monitoring and reviewing critical elements.

**b. Regarding Recommendation No. 2 - Erosion and Sediment Control**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. This response appropriately requires qualified personnel, monitoring, and oversight by the Owner's Representative. Additionally, the QCIP has been amended to ensure that fill areas and slopes achieve proper grading and permanent erosion protection. Furthermore, the QCIP requires Contractor personnel to conduct inspections, as well as periodic inspections by the Engineer of Record.

**c. Regarding Recommendation No. 3 - Subsurface Investigations and Placement of Fill in J.C. Boyle Scour Hole**

- i. The BOC concurs with Renewal Corporation's approach to this recommendation as provided in their response dated January 13, 2023. Renewal Corporation has indicated that at present, it is not possible to safely access the toe area of the slope to make a geotechnical engineering field assessment. Once the hydroelectric project is taken out of operation (following the drawdown) the risk of spill down the Scour Hole will be mitigated, and then a team of experienced geotechnical engineers will safely access and review the base area to confirm to their satisfaction that the toe foundation materials, described as being prevalently boulders, will provide long-term stable support of the proposed fill section, with stable final graded slopes. Renewal Corporation has developed Specification Number 31 05 50 "Materials for Earthwork" as well as associated drawings (C-1335, C-1339, C-1340, C-1341 and C-1623) to provide specific guidance on the placement of material within the scour hole. Renewal Corporation intends to update these specifications and drawings as required to incorporate any recommendations from the field geotechnical investigation. The BOC is satisfied with Renewal Corporation's response.

**d. Regarding Recommendation No. 4 - Considerations for Temporary Construction Emergency Action Plan**

- i. Renewal Corporation has updated the TCEAP to address the BOC's recommendations in an acceptable manner. The BOC appreciates Renewal Corporation's organizing the plan into three implementation phases (Pre-Drawdown, Drawdown and Post-Drawdown) and the use of

the existing PacifiCorp inundation mapping to guide notification procedures and appropriate responses regarding notification and evacuation as needed for downstream populations at risk and construction personnel. They have incorporation potential failure modes as appropriate. Training and practice drills will be included as appropriate during the three phases. The BOC is satisfied with Renewal Corporation's January 13, 2023 response to this recommendation.

**e. Regarding Recommendation No. 5 – Development and Status of Contingency Plans**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. Appropriately, the TCSMP and Construction Schedule have been amended to include a decision framework which identifies a formal process for evaluating the list of potential risk reduction opportunities presented in the construction Potential Failure Mode Analysis (cPFMA). As part of this formal process, the BOC looks forward to reviewing contingency plans on an as-needed basis. Through the communication tools called for in the TCSMP (including minutes from the weekly construction coordination meetings), the BOC would be able to anticipate various activities of interest and the associated contingency plans. The Construction Schedule includes activities for BOC Coordination, Monthly FERC Construction Reports, Quarterly Risk Register Updates, and Periodic Key Milestone Updates.

**f. Regarding Recommendation 6 - Material and Placement Specifications**

- i. In response to the BOC's review of Specifications 31 23 00 (Excavation and Fill Placement) and 31 05 00 (Materials for Earthwork), Renewal Corporation has greatly improved the content of the specifications by providing requisite details for placement, compaction and grain size specification of materials to be used in the work. The BOC is satisfied with Renewal Corporation's response and the expanded detail of the earthwork specifications.

**g. Regarding Recommendation No. 7 - Construction Schedule Risk Reduction Measure Milestones**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. The Construction Schedule and TCSMP have been appropriately modified to include weekly and monthly reporting and meetings in order to identify and address risks and risk reduction measures. The BOC looks forward to receiving the monthly meeting summaries and look-ahead schedules, which will help to inform the timing of periodic site visits which are to be coordinated with the BOC to coincide with critical work activities.



#### **h. Regarding Recommendation No. 8 - Hydraulic Performance of Iron Gate Diversion Gate and Tunnel**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. The BOC recommended development of specific pre-drawdown operation and testing procedures to confirm that the hoist and gate would work acceptably to pass the elevated drawdown as well as post-drawdown flow. The Renewal Corporation indicated that it will develop and execute a testing plan by May 30, 2023 to address the BOC concerns for adequate testing and contingency development. The BOC recommended that contingency plans be developed to consider operating scenarios under varying gate openings. The January 13, 2023 response of Renewal Corporation indicated that CFD modeling was used to model the various scenarios, and that the model would be available to check other scenarios for contingency or while in the drawdown phase if unexpected conditions develop. The contingency modeling would be completed sufficiently before the drawdown period so that there would be adequate time to obtain new parts or modify the operation to accommodate the actual field gate operating conditions. The BOC concurs with this plan.
- ii. Knight Piesold, part of the design-build team, indicated that as part of the design to mitigate tunnel and outlet flow issues, has come up with an alternate solution to Dr. Falvey's recommendation to use stoplogs at the end of the tunnel to help maintain the hydraulic jump in the lined portion of the tunnel. This is presented in the Knight Piesold memorandum to Dr. Falvey dated December 21, 2022. The alternative is to introduce a riprap side embankment, parallel to the flow, downstream of the tunnel outlet structure to provide some lateral constriction in the flow at the outlet and prevent the flow from spreading out too quickly in the outlet channel. This riprap embankment at the tunnel outlet is proposed to be constructed on the right side of the tunnel exit as part of the tunnel modifications prior to draw-down. Knight-Piesold indicates that they expect that there will be some movement of the material as the flow exits the tunnel. No effective riprap diameter was noted in the December 21, 2022 design memorandum. As this is a new recommendation that was not in earlier packages that the BOC was asked to review, the BOC's only comment is that the riprap size used for the embankment should be designed to perform acceptably in the anticipated flows.
- iii. The BOC also recommended that the Renewal Corporation review the sequencing of the embankment removal activities and consider establishing a crest top breach channel in case the embankment needed to be breached during an earlier stage due to gate/tunnel issues that may develop. This was not addressed in the Renewal Corporation's response, and the BOC recommends that this be considered.

- iv. The earlier modeling of the tunnel flows conducted by Knight-Piesold simulated the introduction of air in the lined tunnel to mitigate cavitation and assure that the hydraulic jump/energy dissipation occurred in a controlled manner within the lined tunnel section rather than downstream in the unlined portion of the tunnel where tunnel wall, floor and crown damage could result. Floor baffles and ramps are proposed by the Renewal Corporation (as suggested by Dr. Falvey) in order to better direct flows to increase the Froude number within the lined section to maximize energy dissipation. The BOC was concerned that the turbulence adjacent to the suspended air vent system might be too damaging, and suggested drilling an air shaft to simplify and provide damage resistant air venting. The design team indicated that they re-reviewed the proposed design to confirm the loading conditions on the suspended vent system, and determined that they were confident in the design. The Engineer of Record stated that he believes the proposed venting system represents an adequately robust design for this application and determined that no additional vertical drilled venting is required. The BOC accepts the Renewal Corporation's findings, but notes that the pre-drawdown schedule does not include installation of the baffles and ramps. Also, the BOC recommends that the design team model the potential loss of the vent to help understand the potential consequences and if a contingency is necessary.

**i. Recommendation No. 9 - Removal of Copco No. 1 Adit Steel Conduit**

- i. Renewal Corporation's response, dated January 13, 2023 is satisfactory. The response provided by the Renewal Corporation indicates that the Contractor has evaluated the risk of flooding the work zone and is willing to take on that risk and develop contingency plans. It also appears that the contractor has timed this work in conjunction with the removal of Copco 2 Dam in the 2023 Drawdown Year activities, while water is held at Klamath and behind Copco 1, assuming that Reclamation is in a position to hold water during that time frame. The adit work and steel conduit work at Copco 1 appear to have about three months of float (October, November, and December) prior to planned drawdown on January 1, 2024. The BOC anticipates timely review of contingency plans.

### ***Status of Klamath River Restoration and Recreation Design***

The BOC understands from conversations with the Renewal Corporation that the Klamath basin and recreation restoration to be completed by RES is to remain at the 60% design level until the dam removals have been completed and final erosion patterns and site conditions have begun to be established. The BOC anticipates ongoing involvement in the review of the restoration and recreational design documents.

## CLOSURE

Based on our review of the information provided at this stage of the Project, the BOC respectfully submits this Letter regarding the Final Design Submittal in support of the Renewal Corporation's Amended Application for Surrender of License for Major Project and Removal of Project Works.

The Renewal Corporation and Kiewit have assembled an experienced and technically competent team of planners, designers and contractors capable of achieving a safe and efficient removal of the projects. The BOC appreciates transparency, cooperation, open communication and technical accomplishments.

Yours sincerely,

Dr. Craig Findlay



Dan Hertel



Document Content(s)

LKP-Cover Letter to and BOC Letter Report re Final Construction

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