



March 30, 2023

Electronically Filed

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

Subject: **Bad Creek Pumped Storage Project (P-2740-053)
Relicensing Study Progress Report No. 1**

Dear Secretary Bose:

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the Licensee, owner, and operator of the 1,400-megawatt (MW) Bad Creek Pumped Storage Project (FERC Project No. 2740) (Project), located in Oconee County, South Carolina, approximately eight miles north of Salem. The Bad Creek Reservoir (or upper reservoir) was formed from the damming of Bad Creek and West Bad Creek and serves as the Project's upper reservoir. Lake Jocassee serves as the lower reservoir and is licensed separately as part of Duke Energy's Keowee-Toxaway Hydroelectric Project (FERC Project No. 2503).

The existing (original) license for the Project was issued on August 1, 1977 by the Federal Energy Regulatory Commission (FERC or Commission) and expires on July 31, 2027. Accordingly, Duke Energy is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

Relicensing Studies

Duke Energy developed a Proposed Study Plan (PSP) in consultation with agencies and stakeholders and filed it on August 5, 2022. After the filing of the PSP, Duke Energy held a site visit and Project tour on August 16, 2022, and the PSP meeting on September 7, 2022. Duke Energy also continued to consult with agencies and other stakeholders regarding its proposed studies.

Duke Energy evaluated the comments submitted by the Commission and stakeholders in response to the PSP. Based on Duke Energy's review of these comments, FERC criteria for study requests under the ILP, and readily available information (i.e., associated with the previous licensing effort or resulting from ongoing monitoring activities), Duke Energy proposed six resource studies in the Revised Study Plan (RSP) filed with FERC on December 5, 2022. The Commission approved the RSP with modifications on January 4, 2023.

The six studies in the RSP will support evaluation of the potential effects of continued operation of the Project as well as potential effects of construction and operation of the proposed Bad Creek II Complex. These studies are:

- Water Resources Study
- Aquatic Resources Study;
- Visual Resources Study;
- Recreational Resources Study;
- Cultural Resources Study; and
- Environmental Justice Study.

Duke Energy is filing this Study Progress report with the Commission electronically and is distributing this letter to the parties listed on the attached distribution list. For parties listed on the attached distribution list who have provided an email address, Duke Energy is distributing this letter via email; otherwise, it will be distributed via U.S. mail.

Duke Energy looks forward to continuing to work with Commission staff, resource agencies, Indian Tribes, local governments, non-governmental organizations, and interested members of the public throughout the relicensing process. If there are questions regarding this filing, please contact me at Alan.Stuart@duke-energy.com or via phone at 980-373-2079.

Sincerely,



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Enclosure

cc (w/enclosure): Jeff Lineberger, Duke Energy

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Bad Creek Pumped Storage Project
Relicensing Study Progress Report No. 1
March 30, 2023

1.0 BACKGROUND

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the Licensee, owner, and operator of the 1,400-megawatt (MW) Bad Creek Pumped Storage Project (FERC Project No. 2740) (Project), located in Oconee County, South Carolina, approximately eight miles north of Salem. The Bad Creek Reservoir (or upper reservoir) was formed from the damming of Bad Creek and West Bad Creek and serves as the Project’s upper reservoir. Lake Jocassee serves as the lower reservoir and is licensed separately as part of Duke Energy’s Keowee-Toxaway Hydroelectric Project (FERC Project No. 2503).

The existing (original) license for the Project was issued on August 1, 1977 by the Federal Energy Regulatory Commission (FERC or Commission) and expires on July 31, 2027. Accordingly, Duke Energy is pursuing a new license for the Project pursuant to the Commission’s Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

2.0 STUDY PLAN DEVELOPMENT

In accordance with 18 CFR §5.11, Duke Energy developed a Proposed Study Plan (PSP) in consultation with agencies and stakeholders and filed it on August 5, 2022. After the filing of the PSP, Duke Energy held a site visit and Project tour on August 16, 2022, and the PSP meeting on September 7, 2022. Duke Energy also continued to consult with agencies and other stakeholders regarding its proposed studies.

Duke Energy evaluated the comments submitted by the Commission and stakeholders in response to the PSP. Based on Duke Energy’s review of these comments, FERC criteria for study requests under the ILP, and readily available information (e.g., associated with the previous licensing effort or resulting from ongoing monitoring activities), Duke Energy proposed

six resource studies in the Revised Study Plan (RSP) filed with FERC on December 5, 2022. The RSP includes copies of and summarizes comments received and Duke Energy's responses.

The six studies in the RSP will support evaluation of the potential effects of continued operation of the Project as well as potential effects of construction and operation of the proposed Bad Creek II complex. These studies are:

- Water Resources Study;
- Aquatic Resources Study;
- Visual Resources Study;
- Recreational Resources Study;
- Cultural Resources Study; and
- Environmental Justice Study.

In FERC's Study Plan Determination letter on January 4, 2023, FERC approved the proposed studies as submitted in the RSP except the Recreational Resources Study which was approved with modifications. The Recreational Resources Study was modified to include the following:

- An additional traffic counter was added at the Laurel Valley Trail Access¹
- Revisions to the Recreation Site Inventory Form to include the number and height of bear cables and number of latrines

In addition, Duke Energy provides the following clarifications regarding the Discussion and Staff Recommendations included in the Study Plan Determination (SPD):

- FERC recommended that Duke Energy modify the Recreation Study Plan to include the additional counties that will be used during the future recreation use analysis. As stated in the RSP, Duke Energy will include Oconee and Pickens counties, SC and Jackson and Transylvania counties, NC and any counties in SC, NC, and GA that are reported on the recreation user surveys. Since recreation user surveys have not been completed yet, Duke Energy is unable to list what counties will be reported at this time.
- FERC recommended that Duke Energy include the 14.8 miles of trail that follow logging and access roads in the Conditions Assessment. As stated in the RSP, Duke Energy will include the entire 43 miles of trail, including 28.2 miles of singletrack trail segments and

¹ Although the SPD referenced "Laurel Fork Gap", Duke Energy assumes the Foothills Trail Conservancy and FERC meant to reference the Laurel Valley Trail Access.

14.8 miles of trail that follow logging and access roads, in the Conditions Assessment. Although the Trail Solutions guide on building singletrack will be used as a base for trail condition analysis, this will not exclude non-singletrack trail segments from analysis.

- FERC recommended that the RUN Study include detail boxes and labels for all spur trails within the 43-mile portion of trail to be studied by Duke Energy. Duke Energy will prepare detailed maps of the Duke Energy-maintained, 43-mile portion of the Foothills Trail that identify parcel boundaries, current property owner(s), access locations, spur trails, structures, and facilities/amenities. In addition, as stated in the RSP, two traffic counters will be installed at the Bad Creek Hydro Project Trail Access (i.e., Bad Creek Parking Access Area and Bad Creek Road) and user surveys will be collected at this site.
- FERC requested additional details on the standards used to define the minimum acceptable values of the indicator variables used to estimate the trail’s carrying capacity. Duke Energy held a Recreation Resource Committee Meeting on March 28, 2023 to discuss the carrying capacity methodology with Jeremy Wimpey of Applied Trails Research in attendance.

The following sections summarize progress implementing the relicensing studies as of March 15, 2023.

3.0 WATER RESOURCES STUDY

The components of the Water Resources Study and status of each are provided below:

- **Summary of Existing Water Quality Data and Standards:** Historical Lake Jocassee and Howard Creek water quality data collected by Duke Energy and Clemson University are being compiled and summarized.
- **Water Quality Monitoring in the Whitewater River Arm:** Data collection for the first field season will begin in June 2023 and extend through September 2023.
- **Computational Fluid Dynamics (CFD) Modeling of Velocity Effects and Vertical Mixing in Lake Jocassee Due to a Second Powerhouse:** Velocity effects and vertical mixing will be evaluated by first developing a 2-dimensional hydraulic model to determine the boundaries of the velocity effects. The effort to develop the 2D model has been initiated by Duke Energy. Once the boundaries of the velocity effects have been determined, a CFD model will be developed for that portion of Lake Jocassee potentially affected by a second discharge. The CFD output will be used to evaluate the potential effects of Bad Creek II



operation on stratification in Lake Jocassee. Initial model output is projected to be available in third quarter 2023.

- **CHEOPS Modeling of Water Exchange Rates and Lake Jocassee Reservoir Levels:** The CHEOPS model will be used to evaluate potential effects of Bad Creek II on the frequency, timing, and range of Lake Jocassee reservoir level fluctuations. Initial model results are anticipated to be available in the third quarter of 2023.
- **Future Water Quality Management Plan (WQMP) Development:** Work to develop the WQMP will begin in 2024 after the other Water Resources Study components are complete and additional information is available regarding the construction of a second powerhouse. The WQMP, which will be developed in consultation with the Water Resources, Aquatic Resources, and Wildlife and Botanical Resources Resource Committees (RCs), will likely not be included in the final Water Resources Study. Duke Energy anticipates the WQMP will be developed as a separate standalone management plan and included in the Draft and/or Final License Application.

Variance from Approved Study Plan

The study is proceeding in accordance with the approved study plan.

4.0 AQUATIC RESOURCES STUDY

The components of the Aquatic Resources Study and status of each are provided below:

- **Entrainment:** The previously completed desktop entrainment study has been updated based on stakeholder comments received since the filing of the Pre-Application Document. It will be provided directly to Aquatic Resources RC members and discussed during the spring 2023. A meeting has been scheduled with the Aquatics Resource Committee on April 6, 2023 to discuss the study results. The final report will be provided to the RC members during the fourth quarter of 2023.
- **Desktop Studies on Pelagic and Littoral Habitat Effects:** This effort will use results of the CFD and CHEOPS modeling from the Water Resources Study. CFD modeling results will be used to qualitatively evaluate potential effects to Lake Jocassee stratification, dissolved oxygen, and temperatures throughout the water column. CHEOPS modeling results will be used to assess potential effects within the littoral zone with a focus on lake level fluctuation effects.

- **Mussel Surveys and Stream Habitat Quality Surveys:** Fieldwork for the surveys will begin in July 2023 to evaluate construction of the Bad Creek II Complex.

Variance from Approved Study Plan

The study is proceeding in accordance with the approved study plan.

5.0 VISUAL RESOURCES STUDY

Preliminary work has begun to develop the existing landscape description and to build the viewshed model that will be used for the Seen Area Analysis. As communicated during the Joint RC meeting in February 2023, Duke Energy plans to work with Recreation & Visual Resources RC members during the summer of 2023 to identify Key Views. Photographs will be taken from the Key Views in November 2023 during leaf-off conditions.

Variance from Approved Study Plan

The study is proceeding in accordance with the approved study plan.

6.0 RECREATIONAL RESOURCES STUDY

The components of the Recreation Resources Study and status of each are provided below:

- **Foothills Trail Recreation Use and Needs (RUN) Study:** Data collection began in September 2022 with a break in February 2023. Data collection is on-going and scheduled to continue through November 2023.
- **Foothills Trail Condition Assessment:** Duke Energy has retained a consultant to complete the evaluation. Fieldwork will begin in spring 2023. Duke Energy anticipates distributing a draft study report for Recreation RC review in the fourth quarter of 2023.
- **Whitewater River Cove Existing Recreational Use Evaluation:** Drone flights to capture recreational boating in the Whitewater River Cove will begin in May 2023. Duke Energy anticipates distributing a draft study report to Recreation Resources RC members in the fourth quarter of 2023.
- **Whitewater River Cove Recreation Public Safety Evaluation:** This effort will integrate the CFD modeling velocity data developed in the Water Resources Study with the Whitewater River Cove recreational use data captured during the 2023 boating season. The draft report will be distributed to Recreational Resources RC members in the spring 2024.

Variance from Approved Study Plan



The study is proceeding in accordance with the study plan as modified by FERC.

7.0 CULTURAL RESOURCES STUDY

The archaeological survey began in March and is scheduled to be complete by August 2023. Duke Energy anticipates the draft survey report will be distributed to the South Carolina State Historic Preservation Office, federally-recognized Indian Tribes, and other consulting parties in the fourth quarter of 2023.

Variance from Approved Study Plan

The study is proceeding in accordance with the approved study plan.

8.0 ENVIRONMENTAL JUSTICE STUDY

Data compilation and analysis of EJ communities has begun. Duke Energy anticipates distributing a draft study report to the Operations RC during the second quarter of 2023. Preliminary results indicate there may be no adverse effects to EJ communities, so the public outreach meeting included in the study plan may not be warranted. The need for such a meeting will be discussed with the Operations RC during the summer of 2023 in conjunction with its review of the draft study report.

Variance from Approved Study Plan

The study is proceeding in accordance with the approved study plan.