

REVIEW OF APPLICATION FOR LIHI CERTIFICATION OF THE HIGH FALLS HYDROELECTRIC PROJECT

FERC Project No. 3754 (exempt) Deer River, Lewis County, New York



November 3, 2022 Maryalice Fischer, Certification Program Director

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FINAL REVIEW OF APPLICATION FOR LIHI CERTIFICATION OF THE HIGH FALLS HYDROELECTRIC PROJECT

This report provides final review findings and recommendations related to the certification application submitted to the Low Impact Hydropower Institute (LIHI) by Copenhagen Hydro LLC, a subsidiary of Central Rivers Power for certification of the High Falls Hydroelectric Project (Project). The final certification application was filed on July 15, 2022 and is subject to review under the current 2nd edition LIHI Handbook (Revision 2.05, January 1, 2022).

I. INTRODUCTION

The High Falls Project is a 3.429 MW Project located on the Deer River in the Village of Copenhagen, Town of Denmark, Lewis County, New York. The Project is authorized under Federal Energy Regulatory Commission (FERC) exemption No. P-3754 issued January 14, 1982 granted to Copenhagen Associates, a subsidiary of Hydro Development Group, Inc. The exemption was transferred to Copenhagen Hydro LLC, a subsidiary of Enel Green Power 2015. The Project was subsequently purchased by Central Rivers Power LLC, retaining the prior exemptee name of Copenhagen Hydro LLC.

II. PROJECT LOCATION AND SITE CHARACTERISTICS

The dam was built in 1909 by the Deer River Power Company at river mile 7.75 on the Deer River at the site of High Falls, a natural water fall that plunges 166 feet. Farther downstream are the 25-foot King Falls and the 15-foot Deer River Falls. The area encompassing the three falls forms the Deer River Gorge.

The Deer River is 27 miles long and located in north central New York within the Black River Watershed (Figure 1). It originates at Tug Hill and flows generally northeasterly to the Black River which is highly regulated with numerous dams and hydro facilities, and three storage reservoirs operated by the Hudson River/Black River Regulating District to provide storage of spring runoff, flood mitigation, and low-flow augmentation for the lower Black River which empties into Lake Ontario at Black River Bay, just southwest of the village of Dexter, New York. There are no upstream dams. The King Falls Hydroelectric Project (FERC No. P-7352) was built in 1953 and is located about 2.66 river miles downstream. It does not provide fish passage.

The Project consists of a 175-ft-long and 25-ft high-concrete gravity dam with 2-ft-high flashboards and an impoundment about 0.6 miles long with a surface area of about 4 acres and negligible storage capacity. The Applicant estimated average monthly flows at the dam using linear regression which showed flows ranging from a high of 237 cfs in the early spring to a low of 41 cfs in late summer. Average annual flow is estimated to be 127 cfs.

The impoundment is situated directly above High Falls with the Project penstock following the top eastern ridge line until it drops toward the powerhouse located along the riverbank (see

cover page photo). The impoundment creates a bypassed reach approximately 0.26 miles long.¹ The intakes have 2.5-inch clear spaced trashracks and a 1,350-ft-long, 6-ft-diameter steel penstock leads to the powerhouse which includes three horizontal Francis turbine-generators, Units 1 and 2 are each rated for 1.5 MW and Unit 3 is an induction unit limited to 0.429 MW and operates either on or off with a hydraulic capacity of 35 cfs. Each turbine has a minimum capacity of 0.3 MW. The Project operates in a run-of-river mode with a total installed capacity of 3.429 megawatts (MW) and generates approximately 8,000 MWh annually.



Figure 1. Project Location

¹ Based on Google Earth path marking from the dam to the tailrace, the LIHI application stated 0.7 miles.



Figure 2. Impoundment and penstock looking downstream



Figure 3. Penstock and the High Falls at base of dam



Figure 4. Powerhouse and bypassed reach looking upstream



Figure 5. Powerhouse interior

III. REGULATORY AND COMPLIANCE STATUS

This review included a review of the Project's entire FERC docket from the 1981 application for exemption to present. No compliance issues were identified.

The FERC exemption² was issued January 14, 1982. The Water Quality Certificate (WQC)³ was issued by the NY Department of Environmental Conservation (NYSDEC) on July 8, 1982. It contains construction-related requirements and a general requirement for gradual drawdowns for maintenance purposes and minimization of sediment discharge. The FERC exemption does not contain facility-specific articles, but includes Standard Articles, specifically Standard Article 2 regarding compliance with terms and conditions issued by federal or state fish and wildlife agencies. During the exemption application process, US Fish and Wildlife Service (USFWS) and NYSDEC required strict run-of-river operation and a minimum bypass reach flow of 8 cfs. The FERC exemption was amended on January 6, 2000⁴ to correct the Project's installed capacity and penstock details related to provision of the bypass minimum flow.

IV. PUBLIC COMMENTS RECEIVED OR SOLICITED BY LIHI

The application was publicly announced on July 15, 2022 and notice of the application was forwarded to resource agency and stakeholder representatives listed in the application. No public comments were received by LIHI during the 60-day comment period which ended on September 13, 2022.

V. ZONES OF EFFECT

The Applicant delineated the Project into three Zones of Effect (ZoEs): Zone 1 is the 0.6-milelong impoundment, Zone 2 is the 0.7-mile-long bypassed reach, and Zone 3 is the 2-mile-long tailrace and downstream reach below the powerhouse (Figure 6).

The Applicant selected the standards shown in the tables below. The reviewer agrees that the selected standards are appropriate.

² <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_Number=19820120-0242</u>

³ <u>https://lowimpacthydro.org/wp-content/uploads/2022/07/High-Falls-LIHI_FINAL-Application-06012022.pdf</u> (appendix C)

⁴ <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20000107-0612&optimized=false</u>

	Zone:	1: Impoundment	2: Bypassed Reach	3. Downstream Reach	
River Mile at upper and lower extent of Zone:		RM 8.4 - 7.8	RM 7.8 - 7.1	RM 7.1 – 5.1	
Criterion		Standard Selected			
А	Ecological Flows	1	2	1	
В	Water Quality	1	1	1	
С	Upstream Fish Passage	1	1	1	
D	Downstream Fish Passage	1	1	1	
E	Shoreline and Watershed Protection	1	1	1	
F	Threatened and Endangered Species	2	2	2	
G	Cultural and Historic Resources	1	1	1	
н	Recreational Resources	3	3	3	



Figure 6. Zones of Effect

VI. DETAILED CRITERIA REVIEW

A: Ecological Flow Regimes

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

Assessment of Criterion: The Applicant selected Standard A-1, Not Applicable/De Minimis Effect for the impoundment and tailrace/downstream reach and Standard A-2, Agency Recommendation for the bypassed reach. Impoundments can typically qualify for A-1 since this criterion is focused primarily on riverine reaches, and with no impoundment storage, Standard A-1 is appropriate.

Discussion: The Project is operated in a strict run-of-river mode, with inflow matching outflow. Run-of-river operation is maintained by a headpond sensor and programmable logic controller (PLC) such that units are ramped up, down, or taken off-line to maintain impoundment level at the 1,135.65 ft elevation setpoint.

As discussed above, the Project is located at a 166-foot-tall waterfall, nearly the height of Niagara Falls⁵, and the 0.26-mile-long bypassed reach is supplied with 8 cfs of minimum flow from a 12-inch discharge pipe through the dam four feet below the dam crest (Figure 7).

There is no historical information to determine a scientific basis for the minimum flow and it is not a specific requirement of the FERC exemption or WQC. The minimum flow requirement is encompassed within FERC Standard Article 2 based on resource agency recommendations at the time of the exemption application that indicated the Project would not have a "significant adverse impact on fish or wildlife resources" (appendix C of the LIHI application. In a June 12, 1987 letter USFWS indicated acceptance of the 12-inch pipe and its location.⁶ NYSDEC also accepted it in a May 11, 1987 letter.⁷

At the High Falls Project, the lowest mean daily flow for USGS gage #04258500 formerly located in the impoundment with a period of record from an earlier time period (1929 to 1956) was less than 1 cfs. Of note, the downstream Kings Falls Hydroelectric Project has a 1986 WQC that includes an 8-cfs bypassed reach minimum flow, incorporated into that Project's 1986 FERC license "for the protection of fish and wildlife resources" noting that the 8-cfs flow would "maintain aquatic habitat".⁸ No scientific basis was provided for that flow determination although the FERC environmental assessment for that project which was included in the license document notes a minimum inflow of 0.7 cfs based on streamflow records from 1956 to 1968, similar to the stream data from High Falls.

⁵ <u>https://historicallylewis.org/township_history/denmark/</u>

⁶ <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19870625-0053&optimized=false</u>

⁷ <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19870713-0343&optimized=false</u>

⁸ <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19861006-0136&optimized=false</u>



Figure 7. Minimum flow pipe and discharge

Each turbine has a minimum generating capacity of 300 kW. Using a basic calculation of the relationship between flow, head, and kW with an assumed average unit efficiency of 70%⁹ yields a minimum hydraulic capacity of a turbine to be about 40 cfs. Unit 3 operates either on or off with no modulation of flow with a hydraulic capacity of 35 cfs. Therefore, all flows less than 35-40 cfs would be spilled over the spillway. Flow between 35-40 cfs and the maximum plant capacity of 301 cfs enters the penstock and flows to the powerhouse while the 8-cfs minimum flow is also maintained within the bypassed reach. Excess flows above plant capacity would also be spilled into the bypassed reach.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that although there is no record of a specific scientific basis for the minimum flow, the Project is in compliance with its flow requirements and operates to protect whatever minimal aquatic habitat may exist in the bypassed reach, and therefore satisfies the ecological flow regimes criterion.

⁹ <u>https://www.fs.fed.us/dirindexhome/fsh/2709.15/06-07.txt</u>

B: Water Quality

Goal: Water quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

Assessment of Criterion: The Applicant selected Standard B-1, Not Applicable/De Minimis Effect in all ZoEs to pass the water quality criterion.

Discussion: Project waters are considered Class C Fresh Water (NYSDEC 2022c). Class C waters are suitable for fish, shellfish, and wildlife propagation and survival. The best use is fishing. Primary and secondary contact recreation is also suitable but may be limited based on other factors including the Copenhagen wastewater treatment plant adjacent to the impoundment which may impact contact recreation under some conditions unrelated to Project operations.

The Project reaches are not listed as impaired on the state's draft 2020/2022 impaired waters list.¹⁰ Macroinvertebrate sampling was conducted by NYSDEC in the impoundment and downstream, outside of the Project area below the King Falls dam. Results over three years from both locations indicated that the waters were either not impacted or only slightly impacted, likely as a result of the wastewater treatment plant and agricultural runoff. Dissolved oxygen, temperature, conductivity, and pH monitoring over several years in the impoundment indicated no water quality issues.

The NYSDEC WQC was issued in 1982 (Appendix C of the LIHI application) and contained only construction-related conditions. However, in an October 4, 2022 email to the Applicant, NYSDEC confirmed that the WQC remains valid and in effect, and that the agency believes the Project remains in compliance with it.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project's run-of-river operations do not appear to adversely impact water quality and therefore the Project satisfies the water quality criterion.

C: Upstream Fish Passage

Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

Assessment of Criterion: The Applicant selected Standard C-1, Not Applicable/De Minimis Effect in all ZOEs to pass the upstream fish passage criterion.

Discussion: Impoundments typically qualify for C-1 since once upstream of a dam there is no Project-related barrier to further passage.

¹⁰ <u>https://www.dec.ny.gov/fs/docs/spreadsheets/Draft 2020 2022 Section 303d List.xlsx</u>

There are no upstream passage facilities at the Project. The FERC exemption includes Standard Article 2 requiring compliance with terms and conditions issued by federal and state fish and wildlife agencies. The original USFWS terms and conditions issued in 1981¹¹ included two standard conditions related to reservation of authority to prescribe fishways. To date, this authority has not been exercised. There are no current or historical observations of migratory fish in the Project reaches. The natural barriers downstream of the Project preclude access to most species other than potentially American eel, if present in the watershed.

The natural High Falls at the Project dam are 166 feet high which also precluded passage for any species that might be present. In addition, there are no migratory species present in the Black River to which the Deer River discharges.¹²

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not impact migratory species and is in compliance with agency recommendations, and therefore satisfies the upstream fish passage criterion.

D: Downstream Fish Passage

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by facility operations. Migratory species can successfully complete their life cycles and maintain healthy populations in the areas affected by the facility.

Assessment of Criterion: The Applicant selected Standard D-1, Not Applicable/De Minimis Effect in all ZoEs to pass the downstream fish passage and protection criterion.

Discussion: Downstream reaches typically qualify for Standard D-1, since once downstream of a dam and bypassed reach there is no Project-related barrier to further passage.

There are no downstream passage facilities at the Project. As noted above the FERC exemption includes Standard Article 2 requiring compliance with terms and conditions issued by federal and state fish and wildlife agencies, that were issued by USFWS at the time of exemption proceedings.

Also as noted above, there are no migratory species currently or historically present. For resident species, the LIHI application reported a variety of species within the Deer River watershed including various species of shiner, minnow, dace, bass, trout and other typical warm to cool water species. At the time of the FERC exemption application, USFWS indicated the primary species in the Project vicinity were smallmouth bass, rock bass, and yellow perch. Downstream at the confluence with the Black River, species include Smallmouth Bass, Walleye, Northern Pike, and Chain Pickerel.¹³ There is no indication from internet searches that fishing

¹¹ <u>https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19811207-0333&optimized=false</u>

^{12 2018} LIHI review report for LIHI #34 Black River/Beebee Island

¹³ <u>https://www.newyorkalmanack.com/2021/11/new-black-river-fishing-access-site-at-deer-river-denmark-ny/</u>

within the Project reaches is a common activity, likely due to limited access and the steepness of the falls.

The Project's trashracks have 2.5-inch clear spaced bars which would allow some fish to become entrained in the penstock and turbines. However, none of the species that are or could be present require passage to complete their lifecycles such that any losses from entrainment would not adversely impact fish populations.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not adversely affect downstream fish passage and protection and therefore satisfies the downstream fish passage criterion.

E: Shoreline and Watershed Protection

Goal: The facility has demonstrated that sufficient action has been taken to protect, mitigate or enhance the condition of soils, vegetation, and ecosystem functions on shoreline and watershed lands associated with the facility.

Assessment of Criterion: The Applicant selected Standard E-1, Not Applicable/De Minimis Effect in all ZoEs to pass the shoreline and watershed protection criterion.

Discussion: The Project is located northeast of the Village of Copenhagen and surrounded primarily by agricultural lands with a narrow forested riverine buffer along the impoundment which extends upstream just into the Village with the local wastewater treatment plant discharging to the upper impoundment on the south side of the river and Route 55 parallel to the river on the north side beyond the forested buffer. The downstream reach is more forested with some agriculture.

The Project does not have nor is required to have a shoreline protection or similar plan. The Project boundary encompasses 15.7 acres of land and 6.7 acres of water and there are no lands of ecological significance. The Project also operates in a run-of-river mode which helps to stabilize the impoundment shoreline and the bedrock nature of the bypassed reach is not likely to be subject to erosion.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project has little to no impact on the shoreline and therefore satisfies the shoreland and watershed protection criterion.

F: Threatened and Endangered Species

Goal: The facility does not negatively impact federal or state listed species.

Assessment of Criterion Passage: The Applicant selected Standard F-2, Finding of No Negative Effects in all ZoEs to pass the threatened and endangered species criterion.

Discussion: Two federally listed bat species with potential to occur in the Project vicinity are the endangered Indiana Bat (*Myotis sodalist*) which may occur in the tailrace and the threatened Northern long-eared bat (*Myotis septentrionalis*) which may occur in all three ZoEs. Both species are also state listed. The LIHI application indicated that New York Environmental Resources Mapper (NYERM) was used to review State rare, threatened, and endangered species potentially present in the Project vicinity, which indicated that bat habitat is located adjacent to Copenhagen Village on the Eastern side but does not cross over the Deer River, or where the Project is located.

American Hart's-tongue fern (*Asplenium scolopendrium var. Americanum*) is a federally listed plant identified as potentially occurring within the tailrace. It is often found in close association with dolomitic limestone gorges and in cool limestone sinkholes in mature hardwood forests. It requires high humidity and deep shade that is provided by mature forest, or overhanging cliffs.

Migratory birds that could be present include bald eagle (*Haliaeetus leucocephalus*) and Bobolink (*Dolichonyx oryzivorus*). Bald eagle is state listed as endangered and federally protected under the Bald and Golden Eagle Protection Act. Bobolink is not listed within the state of New York or federally.

There are no critical habitats for any listed species in the Project area. The Applicant reported that vegetation management is limited to periodic mowing, weed whacking, and brush clearing around Project structures and does not require tree clearing that could affect Norther long-eared bat or bald eagle habitat. It is unlikely that run-of-river operations would adversely affect the American Hart's-tongue fern if it is present.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project is unlikely to affect listed species and therefore satisfies the threatened and endangered species protection criterion.

G: Cultural and Historic Resources Protection

Goal: The facility does not unnecessarily impact cultural or historic resources associated with the facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

Assessment of Criterion: The Applicant selected Standard G-1, Not Applicable/De Minimis Effect in all ZoEs to pass the cultural and historic resources protection criterion.

Discussion: The Village of Copenhagen was developed within the Town of Denmark in 1800 when Nathan Munger and his son erected their first gristmill followed by a sawmill the following year, both on the Deer River. According to the LIHI application, the village that grew up around this mill was called Munger Mills, with most of its residents considered Federalists in support of British rule. But after the news of the British attacking Copenhagen, Denmark, the republican villagers agreed in a village meeting to take on the name of Copenhagen to shame local Federalists for their support of the British. The original mills built along the river are no longer standing. On September 12, 1890, the worst recorded flood on Deer River came roaring down from the hills sweeping away all obstacles within reach of its raging torrent. Several buildings, waterwheels, bridges and dams were carried away.¹⁴ The New York Cultural Resource Information System indicates that the Village of Copenhagen is an Archeologically Sensitive Area, however, there are no National Register Buildings within the Town of Denmark or downstream of the Project. Based on Project age, structures could be eligible for listing (Figure 8).

There are no requirements in the FERC exemption related to cultural and historic resources. However, the Applicant reports that prior to any construction or development, they would consult and cooperate with the State Historic Preservation Office (SHPO) to determine if any archeological or historic resource surveys and any mitigating measures would be needed, and they would notify the SHPO if any items of historical significance are discovered during operations or any construction activities.



Figure 8. Historical view of High Falls (with dam at top center and penstock at top right) ¹⁵

¹⁴ <u>https://historicallylewis.org/township_history/denmark/</u>

¹⁵ Source <u>https://historicallylewis.org/township_history/denmark/</u>

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not impact cultural or historic resources and therefore satisfies the cultural and historic resources protection criterion.

H: Recreational Resources

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

Assessment of Criterion Passage: The Applicant selected Standard H-3, Assured Accessibility and Use in all ZoEs to pass the recreational resources criterion.

Discussion: The Project has no formal recreational facilities, in part due to the relatively small footprint and the height and steepness of the bypassed reach that precludes access. The 1981 USFWS terms and conditions include a condition requiring provision of free public access where safe and reasonable to do so, and informal fishing and boating occur in the impoundment and downstream reach.

The LIHI application describes non-Project recreational opportunities including in the nearby Adirondack Park, many stocked trout streams in the watershed, and whitewater boating opportunities upstream of the Project over 12.4 miles from a put-in in the Town of New Boston, through part of the Deer River gorge to a take-out just above the dam. Additional whitewater opportunities occur downstream of the Project to a take-out at another falls just above the Route 26 Bridge.¹⁶

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project allows free public access where safe, and satisfies the recreational resources criterion.

VII. CERTIFICATION RECOMMENDATION

This review included evaluation of the application and additional information provided, a review of the FERC elibrary, and a review of other publicly available information. Based on this evaluation, the High Falls Project meets the goals and standards of the LIHI Criteria. A 10-year term with no conditions is recommended.

¹⁶ <u>https://www.americanwhitewater.org/content/River/view/river-detail/10865/main</u>