Memorandum

To: Michael Sale, Senior Technical Advisor, LIHI

From: Jeffrey Cueto, P.E.

Date: April 26, 2017

Re: Black Bear Lake Hydroelectric Project – LIHI Certificate #22
Recertification Request

This memorandum contains the results of my review of the recertification request for the Black Bear Lake Hydroelectric Project (Project), located on Prince of Wales Island in the Alaska Panhandle and partially in the Tongass National Forest. It is owned by Alaska Power & Telephone Company (AP&T). LIHI publicly noticed the application for recertification on November 18, 2016, with comments due by January 19, 2017. No comments were filed in response to this formal notice.

Fred Ayer, former LIHI Executive Director, did the original review for certification of the Project in 2006, and the Board certified it for a term of five years (through May 19, 2011) subject to one special condition related to amended flow standards, discussed below. The Project was recertified by letter dated November 19, 2011 after a determination of no material changes that would affect the LIHI criteria and the absence of any changes to those criteria in the intervening five years. The certification term was extended through May 19, 2016, and more recently through June 30, 2017 to accommodate the recertification application review.

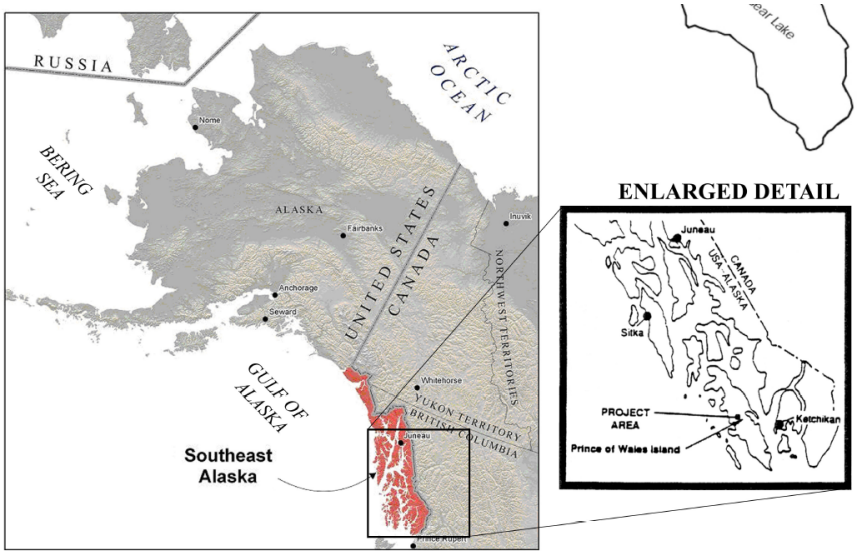

Figure 1. Project location.

I. Recertification Review Standards.

Beginning in 2016, LIHI reviews new applications, both initial applications and recertification applications, under a revised set of criteria and an updated process, all outlined in the Low Impact Certification Program 2nd Edition Handbook (March 7, 2016). Section 6 of the Handbook addresses the recertification process, which is comprised of two stages. Under Stage I, LIHI can expeditiously recertify a project if it has a complete application and finds that there is neither a material change in the criteria or process nor a material change in the facility that may affect conformance with the criteria. If a material change determination is made, then the application moves to Stage II for a full review under the criteria. Since the Project has not previously been subject to review under the new Handbook criteria and because that fact alone constitutes a material change, the application is subject to a Stage II full review under the revised criteria. The scope of review as described in the Handbook is:

> The Stage II recertification review involves a complete review of the application package, a search of public records associated with the facility, and all other necessary inquiries (e.g., to resource agencies and local non-governmental organizations) to resolve factual disputes, evaluate the veracity of claims, or make other inquiries as needed. The application reviewer also reviews and summarizes all public comments received.
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> At the conclusion of the full, Stage II review, the application reviewer will produce a detailed reviewer's report similar to that issued for an initial certification and make a recommendation to the Executive Director as to whether LIHI's criteria are still met by the facility, in light of the material change and/or the change in LIHI's criteria or interpretation.

II. Summary Recommendation.

The Project is materially the same facility as was licensed on November 9, 1993 and developed in 1994-95, except for a change in the monthly conservation flow standards to address winter lake storage limitations, further discussed below. Because the Project occupies land of the Tongass National Forest, the federal license (FERC Project No. 10404) includes requirements prescribed by the U.S. Forest Service (USFS) by letter dated August 17, 1992 (articles 101-114). FERC considered the water quality certification to have been waived as the State had not acted on the application within one year. Consequently, there are no mandatory conditions related to a water quality certification.

Based on my review of the record, including the original LIHI reviewer report from 2006, the 2011 recertification reviewer report, and the files contained in FERC eLibrary and entered subsequent to the last recertification review, AP&T has an excellent track record with respect to compliance with the terms of the federal license. The application and written record were sufficient to obviate the need for me to solicit comments from, or consult with, state and federal agencies. Agency letters contained in the application were supportive of recertification. The Applicant meets annually with the USFS and

documents these meetings for the FERC record; none of the related documentation revealed any significant issues.

Given these facts and my review under the present criteria (summarized below), I recommend that the Project be recertified for the standard term of five years with no special conditions attached.

III. Standards Review

Criterion 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.

Review: The facility cycles flows using 215-acre Black Bear Lake, a natural alpine lake, functionally as a storage reservoir with a drawdown of up to 15 feet. There is no dam. The lake watershed is 1.82 square miles. Black Bear Lake is the origin of Black Bear Creek.

Operation is load following with a ramping restriction of 1 cfs per hour both on startups and shutdowns. Penstock withdrawals are via a siphon intake set at 25 feet below the full elevation. A gross head of 1,490 feet is developed by bypassing 4,300 feet of Black Bear Creek.

Figure 2. View of Project shortly after completion.

In the event of a shutdown, flows are discharged at the head of the falls utilizing a bypass pipe. Alternatively, for short-term shutdowns, flow can be maintained via the turbine deflectors.

The station has a hydraulic capacity of 45 cfs. The average annual flow is estimated at 28 cfs. Data from 2012 and 2014 provided in the application shows that there is typically a winter drawdown up the maximum of 15 feet to meet the power needs of the island population and reduce reliance on backup diesel generators.

Rainbow trout were introduced to the lake in the 1950s and became a self-sustaining. To address concerns over the impact of the drawdown, and as required under License Article 404, population counts were done for seven years following the start of operation, and habitat surveys were completed. Based on the study results, FERC issued an order on March 17, 2004 relieving the licensee from further data collection and concluding that sufficient spawning habitat remained to sustain the trout population.

The bypass reach is mostly bedrock falls that transition to a reach of the creek with a coarse alluvial bed material for about 1,000 feet. In that reach, flows historically infiltrated into an aquifer, reemerging to become surface flow at a point about 500 feet below the present tailrace. During low-flow periods, all flows would go subsurface in this reach. The lower end of this reach is the beginning of what the Applicant refers to as the "anadromous reach." Salmonid species found in the anadromous reach include chum salmon, pink salmon, sockeye salmon, coho salmon, and Dolly Varden trout.

In order to help maintain the benefits of the aquifer (sustained flows and temperature moderation during the summer), half of which is now bypassed, the tailrace construction included an infiltration gallery, which is a requirement under License Article 403. FERC adopted the Applicant's proposed monthly minimum flow schedule in License Article 405; the minimum flows are guaranteed from storage when lake inflows drop below the minimums.

Article 406 required gaging for compliance monitoring. In its Order Modifying and Approving Streamflow Gaging Plan (August 18, 1995), FERC approved the licensee's proposal to monitor the downstream salmonid spawning distribution for five years in lieu of the installation of a streamflow gage. Based on the collected data, FERC accepted a compliance monitoring plan that does not require gaging.

Figure 3. Project powerhouse and tailrace upon completion of construction.

According to the FERC Environmental Assessment (June 25, 1992)(pp. 24-25), the precipitous nature of the bypass results in a lack of viable fish habitat. As part of its application, AP&T provided a letter from the Alaska Department of Fish and Game (ADFG) (February 13, 2017) stating that the diversion of flows from the bypass results in a negligible loss of fish habitat.

With regard to the maintenance of downstream flows, AP&T found that it frequently had to seek a waiver from ADFG to reduce the flow release below minimums in late winter when storage was close to being fully depleted due to low inflows to the lake. To address this, AP&T sought and received approval (FERC Order Amending License, January 7, 2013) to operate under a special protocol when the lake dropped to a stage of -14 feet. Under the Low Water Operations Plan, operation converts to true run-of-river if the stage drops to -15 feet. Waivers are no longer needed for this particular circumstance. This problem was noted in the original LIHI review and resulted in a special condition requiring AP&T to keep LIHI apprised of any actions related to modifying the minimum flow requirements. Later, when the Project was being recertified, LIHI imposed the following related condition:

> By June 15, 2012, the Applicant submit to LIHI evidence that it has secured resource agency and FERC approval of a proposed operating protocol allowing for deviations from monthly minimum flow requirements when inflows to the Project do not allow the minimum flow requirements to be met. If the Applicant fails to submit the evidence or if such approval is not secured, LIHI will reserve the right to suspend or cancel the recertification.

AP&T provided LIHI with a copy of the license amendment order on January 13, 2014 as a supplement to the 2013 annual compliance statement.

Conclusion: The Ecological Flow Regime Standard A-1 (Not Applicable/De Minimis) is met in Zone 1 (Reservoir), and A-2 (Agency Recommendation) is met in the other two zones.

Criterion 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.

Review: The waters affected by the Project are relatively pristine. The Project affects the dissolved oxygen and temperature characteristics of Black Bear Creek due to two primary factors: 1) flows from the lake are no longer discharged from the surface of the lake but drawn from the intake, which is at a depth of up to 25 feet below the water surface, and 2) the influence of flows passing down the falls has been eliminated. FERC staff concluded in its licensing review that there would be no significant degradation of water quality. While the lake can thermally stratify in the summer, the intake is in the epilimnion, and there would not be a hypolimnetic withdrawal with potentially depressed dissolved oxygen concentrations. Pursuant to License Article 402, AP&T completed five years of post-licensing temperature monitoring, which was accepted by FERC as demonstrating that "water temperatures during project operation were on average less than pre-project averages but within the range of pre-project temperatures." (FERC letter to AP&T, October 23, 2001)

AP&T applied for a state water quality certification on December 18, 1990; however, certification was deemed waived by FERC since the Alaska Department of Environmental Conservation (ADEC) failed to act within one year. While certification was waived, ADEC did issue a certification on November 10, 1992, subject to three conditions requiring 1) reporting of significant impacts to water quality; 2) continuing fishery and water quality studies during construction and for five years following project completion and addressing identified problems; and 3) configuring the project so as not to interfere with Sealaska's ability to explore and develop breccia mineralized areas.

Alaska's 2010 Listing of Impaired Waters, the most recent EPA-approved listing, does not include any waterbodies affected by the Project:

http://dec.alaska.gov/Water/wqsar/Docs/2010impairedwaters.pdf

Conclusion: The Water Quality Standard B-1 (De Minimis Effect) is met in all three zones as the change in water quality caused by the Project does not alter the physical, chemical, or biotic water characteristics necessary to support fish and wildlife resources or human water uses. The waterbodies are not federal Clean Water Act Section 303(d) listed as impaired.

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, sustainable fish and wildlife resources in areas affected by the facility.

Review: No migratory fish are affected by the Project. The resident rainbow trout population in the lake is not migratory, and anadromous fish do not ascend Black Bear Creek to the Project tailrace. Sufficient flows are maintained below the tailrace to sustain anadromous fish reproduction.

Conclusion: The Upstream Fish Passage Standard C-1 (Not Applicable) is met in all three zones. There are no migratory fish in the immediate vicinity of the facility, and the facility is not the cause of extirpation of such species as they were not present historically.

Criterion D - Downstream Fish Passage and Protection

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. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.

Review: With respect to migratory fish, the relevant facts are essentially the same as those for upstream passage. For the reservoir fishery, the fish are protected from entrainment and impingement by the intake structure as designed with a wedge-wire screen as required under License Article 407.

Figure 4. Screened intake.

Conclusion: The Downstream Fish Passage Standard D-1 (Not Applicable/De Minimis Effect) is met in all three zones. Migratory fish are not present, and the lake resident population of fish are protected from entrainment and impingement.

Criterion E – Shoreline and Watershed Protection

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

Review: The Project is partially within the Tongass National Forest, occupying 171.5 acres of federal land. The Project has no shoreline management plan. The terrain around the reservoir shoreline is generally steep and primarily consists of bedrock and talus slopes in a natural condition.

Active management is unnecessary, and there is limited public recreational use. Intermittent recreation does take place at the far, or eastern, end of the lake where there is a USFS cabin that is mainly used by hunters in the fall. Offsite mitigation for recreation was approved by the USFS and FERC (FERC Order Deleting Articles 107, 108, 109 and 413, July 10, 2006). Unrelated to project construction, the local Nation Corporation, Sealaska, extensively logged the project area in the 1980s, and the forest has been recovering since (see Figure 2).

Conclusion: The Shoreline and Watershed Protection Standard E-1 (Not Applicable/De Minimis Effect) is met in all three zones. To the extent that the Applicant has some control over lands within the Project boundary, special protection is unnecessary as the lands do not have "significant ecological value for protecting water quality, aesthetics, or low-impact recreation" (LIHI 2nd ed. Handbook, p. 10). There are no shoreline management plans for the lake nor for the streams or similar protection required at the facility.

Criterion F - Threatened and Endangered Species Protection

Goal: The Facility does not negatively impact listed species.

Review: The Applicant provided a current list of federally protected threatened and endangered species for Alaska (Application, Appendix M). No listed species are currently present in the site vicinity or were present at the time the Project was developed.

Conclusion: The Threatened and Endangered Species Protection Standard F-1 (Not Applicable/De Minimis Effect) is met in all three zones. There are no listed species present in the facility area or downstream reach, and the facility was not responsible for the extirpation of listed species if they were previously there.

Criterion G - Cultural and Historic Resource Protection

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

Review: In 1980 and 1982, a cultural resources assessment for construction of the Project was conducted. Literature searches at the time did not identify any cultural resources within the areas to be impacted by Project development. Letters dated September 26, 1988, and October 5, 1990, from the State Historic Preservation Officer (SHPO) confirmed that no cultural resources would be affected by the Project. A letter dated November 14, 1990, was also received from the USFS Ketchikan Area Archaeologist confirming that no cultural resources would be affected by Project construction. If cultural resources are discovered during operation, License Article 415 requires consultation with the SHPO and the USFS and preparation of a cultural resources management plan.

Conclusion: The Cultural and Historic Resource Protection Standard G-1 (Not Applicable/De Minimis Effect) is met in all three zones as there were no resources identified at the Project site during the licensing process and any resources discovered in the future are protected under Article 415.

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.

Review: Active management is unnecessary, and there is limited public recreational use. Intermittent recreation does take place at the far, or eastern, end of the lake where there is a USFS cabin that is mainly used by hunters in the fall. As licensed, the Project was to provide a trail, a float and boat at the USFS cabin, an interpretive kiosk at the powerhouse, and a trail connecting the powerhouse and the cabin, and following the lake shore. In lieu of these facilities being developed, offsite mitigation for recreation was approved by the USFS and FERC (FERC Order Deleting Articles 107, 108, 109 and 413, July 10, 2006). AP&T contributed funding for the construction of Twelvemile Cabin, a fully accessible cabin on Twelvemile Inlet on Prince of Wales Island.

Conclusion: The Recreational Resources Standard H-1 (Not Applicable/De Minimis Effect) is met in all three zones. While technically the standard is, *The facility does not occupy lands or waters to which the public can be granted access and does not otherwise impact recreational opportunities in the vicinity of the facility*," it is my opinion that the Project to should be considered to qualify as it has a de minimis impact on recreational use. Since the lands are in public ownership with unrestricted access, I recommend applying H-1. The other standards do not fit the circumstances for this Project.