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Via email and USPS
Priority Mail

Re: Beaver River Project Comments

This letter comments on the Low Impact Hydropower Institute's (LIHI) Recertification review of Erie Boulevard's Hydropower (Erie) Beaver River Project for the five-year period beginning July 16, 2018. It questions Erie's compliance with the LIHI 's Criterion "A" governing flow releases and water level control downstream from the Moshier development.

LIHI's Criterion "A", "Ecological Flow Regimes," requires the applicant (Erie) to apply an ecosystem approach to achieve appropriate flow management that supports fish and wildlife resources by considering base flows, seasonal variability, high flow pulses, short term rates of storage and year to year variability. Applicants must demonstrate compliance with at least one of LIHI's standards described in A-1 through A-4 of LIHI's handbook.

In its application Erie states it is in compliance with standard A-1 concerning downstream releases from the Moshier development in Zone 3, which extends from the Moshier Powerhouse downstream approximately 0.4 miles to Beaver Lake.

Standard A-1 is defined in LIHI's Handbook as follows:

"Standard A-1 Not Applicable/DeMinimis Effect. The facility operates in a true run of river operational mode (emphasis added) and there are no bypassed reaches or water diversions associated with the facility or the facility is located within an existing water conduit that does not discharge into natural waterways."

Erie's justification for applying Standard A-1 to Zone 3 of the Moshier development states:

"Zone 3 of the Beaver River Project is the tailrace area downstream of the Moshier powerhouse and does not include a bypassed reach. The Beaver River Project is in compliance with resource agency conditions issued regarding flow conditions. The FERC license, 1995 Settlement Offer, and Section 401 WQC include the requirements for flow releases and water level control recommended by the NYSDEC and USFWS.

All of the license and settlement requirements pertaining to flow conditions and impoundment levels have been implemented at the Beaver River Project.

The 1996 FERC license (Article 409), 1995 Settlement Offer, and 401 WQC require Erie to provide a base flow of 250 cfs through the existing unit and minimum flow structure at the High Falls development. A base flow was not recommended at the Moshier development.

Erie remains in compliance with the established flow conditions and impoundment levels and maintains records of these conditions at the Project. In the event of a deviation from established minimum flows or impoundment levels, Erie files documentation with FERC detailing the reasons for the deviation."

This justification for applying Standard A-1 to Zone 3 is misleading. By selecting Standard A-1 Erie implies the Moshier development is a "true run of river" operation. In fact, Moshier is a peaking operation and the relevant question regarding the waters below the Moshier powerhouse is whether the downstream flow regimes meet the ecological goals of Criterion A.

Erie's releases from the Moshier powerhouse and their relevance to Erie's re-certification application are discussed in the following sections of this letter.

1. Erie does not maintain Beaver River flows in Zone 3 in a “true run of river operational mode.”
2. Beaver Lake should be classified as a “designated zone of effect.”
3. Within the Beaver Lake zone, the correct LIHI standard for evaluating the impacts of Erie’s peaking operation at Moshier is A-4 “Site specific studies.”
4. These issues were not made known to LIHI at that the time of LIHI’s certification of the Beaver River Project in 2013.

1. Beaver River Flows in Zone 3

The Moshier development operates in a peaking mode. The term “peaking” generally refers to the mode of operation of a hydro facility where water is released in accordance with electricity demand.

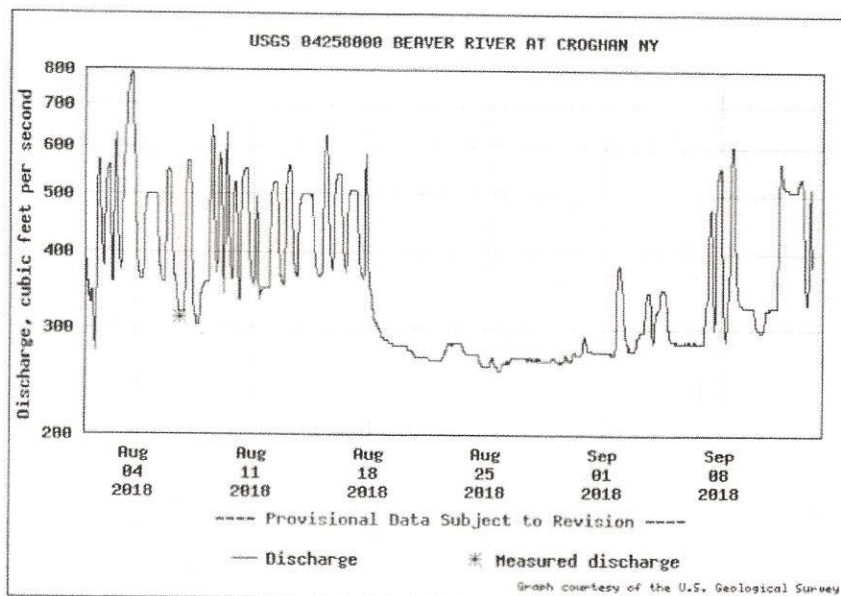
The FERC license P-2645 granted to Niagara Mohawk Power Corporation (NMPC) (and later assigned to Erie and which Erie now holds) states that “NMPC operates the eight developments as store and release facilities that operate in a peaking mode” and that NMPC “discharges water in a concentrated time frame associated with peak electric demand periods.” This section of the license further states, “discharges are curtailed during off peak hours.” (Project Operation, Page 16, Paragraph 2 of the “Environmental Assessment for Hydropower License”)

In the section discussing “River Flow”, the Environmental Assessment states on page 32:

The developments of the Beaver River Project operate in conjunction with the daily releases from Stillwater Reservoir. Normal releases from Stillwater Reservoir are governed in part by the elevation of the downstream reservoir, Moshier. The objective is to keep the water level in Moshier Reservoir at the top of the flashboards, 2 feet over the dam crest. This enables Moshier to operate at maximum head; maximum hydraulic

capacity is about 542 cfs plus an 80 cfs (minimum flow plus leakage) constant release through the dam. Moshier is a peaking plant and operates at maximum capacity during peaking hours. This is possible due to a release at Stillwater of 50 cfs on a 24 hour basis.

A good example of the potential effects of Erie's peaking operation at Moshier on flows throughout Erie's Beaver River Project is illustrated in the following USGS graph showing cfs flows in the Beaver River at Croghan during the period from August 4, 2018 to September 8, 2018:



The graph demonstrates that daily high flows peaked by approximately 300 cfs over low flows from August 4, 2018 to August 18, 2018 when a relatively constant flow of approximately 250 cfs prevailed (250cfs is the minimum flow at Croghan required under Erie's license) until September 2, 2018 when peaking operations recommenced at Moshier. The period from August 19, 2018 to September 7, 2018 coincides with a curtailment of releases from the Moshier impoundment when Erie made repairs to the 2-foot high flashboards on the Moshier dam. (See letter from Brookfield to FERC dated September 7, 2018 included in FERC's Erie license file.)

Two conclusions can be drawn from the above: First, the Beaver River in Zone 3 is not maintained by Erie "in true run of river operational mode",

and Second, the peaking operations at Moshier have a significant effect on water flows throughout Erie's Beaver River Project.

2. Beaver Lake should be classified as a "designated zone of effect"

Erie's application describes Zone 3 as the .4 mile section of the Beaver River between the Moshier powerhouse and Beaver Lake. This section of the river is the tailwater of the Moshier powerhouse. This tailwater surges and subsides in response to Moshier's peaking operations. The fluctuating tailwater empties into Beaver Lake where it pools and forms a short term storage facility serving Erie's Eagle development.

Because the level of the Lake varies in relation to Moshier's tailwater flows, it is arbitrary for Erie to ignore the environmental effects of the Moshier peaking operation on the Lake. Beaver Lake should be classified as a "designated zone of effect" in Erie's application to LIHI. (See LIHI Handbook 4.1.1 Facility Description)

Beaver Lake contains important shoreline wetlands and wildlife habitats. The lake is shallow and its water levels fluctuate in response to releases of water from the Moshier development. The rise and fall of water levels in the lake submerge and expose numerous marshy islands in the lake. Loons, eagles, and beaver are often observed on the lake.

Erie has not disclosed in its application to LIHI any of its data regarding its peaking operations at the Moshier development so the timing and volumes of water discharged into Beaver Lake and the impacts on the lake are unknown.

What is known is that fluctuations of water in Erie's impoundments can have adverse effects on wetlands, water quality and wildlife. The fluctuation of water levels in Beaver Lake caused by the Moshier peaking operation may be similar to water level fluctuations in Erie's impoundments.

Thus, the potential adverse effects on the ecology of Beaver Lake that may be caused by the rise and fall of water levels stemming from Erie's peaking

operations at Moshier may mirror those associated with fluctuations of water levels in Erie's impoundments. The effects on impoundments are well documented.

Thus on page 56 of the Environmental Assessment in a discussion of the environmental impacts of water fluctuations, the following is stated:

"Impoundment fluctuations create an unstable environment for both plants and wildlife. Although the proposed impoundment fluctuations are, in general, improvements over previous levels, there is still the potential for 3 foot fluctuations in four of the impoundments during low flow periods (when 250 cfs cannot be passed at High Falls with the normal fluctuation restrictions at project impoundments). Depending upon season when low flow condition occurs, these fluctuations could result in the loss of aquatic furbearer denning sites, increased mortality of bottom hibernating reptiles and amphibians, reduced reproductive success of nesting waterfowl and altered plant species composition, growth and water regime of important shoreline wetland and wildlife habitats."

Loons on Beaver Lake are particularly vulnerable. Classified in New York as a "Species of Special Concern" they cannot cope with fluctuating water levels during nesting, See Judith W. McIntyre, The Common Loon University of Minnesota Press, 1988 Pages 196-198.

Concerning water quality, the Environmental Assessment on page 41 states:

"Water quality studies indicated that increased flows are associated with low pH. Increased flows to the bypassed reaches, therefore, could result in lower pH than would be found under normal, unaltered stream flows."

In its discussion of pH levels in the Moshier Development the Environment Assessment on page 37 states:

The Moshier Development surface water pH levels are extremely low (4.5 to 5.0). These conditions typically occur beneath the ice cover from February to April. During the warmer months, the pH levels tend to be higher at the surface and lower in the hypolimnion. The highest pH values recorded are only slightly above 6.0 while midcolumn pH values are generally between 5.5 and 6.0.

Given what is now known about the potential adverse effects on Beaver Lake that may be caused by its hydro operations at Moshier, Erie should amend its application to LIHI by including Beaver Lake in a separate designated zone of effect.

3. Within the Beaver Lake Zone the correct LIHI Standard for evaluating the impacts of Erie's peaking operations at Moshier is A-4 "Site specific studies"

The velocity of Moshier tailwater released into Beaver Lake is reduced as the tailwater enters the lake where it pools and transforms the lake into a temporary storage facility serving the downstream Eagle development. The rate of discharge from the lake of this pooled water affects the rise and fall of lake levels. Since Erie controls these flows, it is appropriate for Erie to classify the Beaver Lake zone under LIHI's Criterion A - "Ecological Flow Regimes". Because there are no applicable state and federal agency recommendations governing the fluctuations of water levels in Beaver Lake, Erie should classify the effects of the tailwater flows on the lake under LIHI's Standard A-4 "Site Specific Studies". These studies should result in a flow ecology model for the lake that discloses the following:

- The real time volumes of water released from its Moshier powerhouse into Beaver Lake during Erie's peak and off-peak operations
- Measurements of water levels at various points in Beaver Lake relating to its releases at Moshier
- Effects of Erie's peak and off peak operations at Moshier on the shoreline vegetation, aquatic vegetation, and wildlife in Beaver Lake

- Measurements of pH values of the water released during its peak and off-peak operations at Moshier
- Measurements of pH values at various points in Beaver Lake

4. The issues of concern raised in this letter were not made known to LIHI at the time of its certification of the Beaver River Project in 2013

At this stage of LIHI's recertification process (Stage 1) LIHI should make a "determination of material change" in Erie's operation of the Beaver River Project. This determination is appropriate because the issues concerning the peaking operations at Moshier were not raised by any party and were not fully disclosed by Erie in connection with its application to LIHI in 2013. The issues of concern identified in this letter are material and relevant. They are not raised for any purpose other than to elicit scientific based studies of the effects on Beaver Lake of Erie's peaking operations at the Moshier development.

Respectfully submitted,



Edward D. Earl