Brookfield

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January 23, 2019

Shannon Ames, Executive Director
Low Impact Hydropower Institute
329 Massachusetts Ave, Suite 2,
Lexington, MA 02420

Subject: Response to Letters of Appeal LIHI Certificate # 7 Beaver River

Dear Ms. Ames,

Erie Boulevard Hydropower, L.P. ("Erie") filed with the Low Impact Hydropower Institute ("LIHI") its recertification documents for the Beaver River Project in 2018 (the "Project") and ultimately was granted a preliminary recertification letter dated December 5, 2018. The preliminary certificate requires a 30-day comment period during which two appeals letters were received by LIHI, one from Edward D. Earl, dated January 5, 2019 (the "Earl Letter"), and one from Robert M. Hough, dated January 5, 2019 (the "Hough Letter" and together with the Earl Letter, the "Appeal Letters"). Erie has prepared this letter in response to the concerns expressed in the Appeals Letter concerning Project operations.

The two appeal letters filed raise various concerns and issues, including:

(i) concerns regarding "high water levels" and alleged flooding and damage to Beaver Lake property owners caused by operation of the Moshier and Eagle dams, including due to the long-ago installation of 12-inch flashboards on the Eagle River dam;
(ii) lack of representation by Beaver Lake residents on the Beaver River Advisory Council ("BRAC"), and failure of BRAC or Erie to sufficiently engage with Beaver Lake residents;
(iii) failure of LIHI's certification criteria to take account of Beaver Lake resident concerns; and
(iv) failure of LIHI and/or its designated outside evaluator to request unspecified data from Erie.

The Hough Letter further alleges that Erie is in violation of its FERC license and associated settlement agreements, an allegation which Erie takes great exception to. Looking through nearly 20 years of past correspondence, and flow incident summaries of which Erie had readily available, Erie is not aware nor been notified by a regulator of any license violations in regard to water flows or impoundment management at any of the eight developments comprising the Project, including either of the Moshier or Eagle developments.

This letter does not address the concerns identified in items (iii) and (iv) above, which relate to LIHI's handling of the recertification process. However, Erie believes LIHI has managed the recertification process correctly to date and that the vague concerns expressed about LIHI's management of the process do not justify a delay in issuing the recertification.

Concerns Regarding "High Water Levels" and Flooding:

The concerns expressed in the two appeal letters regarding flooding and high water levels echo complaints which have been made over the many decades of the Project's existence. These concerns were raised and discussed with residents within the context of the 1996 relicensing of the Project. Erie believes that the Moshier and Eagle

developments provide significant benefits to the residents of Beaver Lake by helping to moderate fluctuation in lake levels.

Historical Record of Beaver Lake and Construction and Operation of the Moshier and Eagle Dams

In Erie's archives are letters and reports dating back into the early part of the 1900s that relate to the water elevations at Beaver Lake, its topographical features and the rationale and impact behind certain elements of its design, the flashboards on top of Eagle dam in particular. Those records include an excerpt from a State Water Supply Commission report from 1910 that documents that in its natural state, the Beaver Lake area was "swamp land" that experienced natural flooding of much as ***6 feet above normal levels***.

Flashboards have been installed on Eagle dam for a considerable portion of its history, and Erie is permitted under its license to use them. Erie's FERC license specifically authorizes the use of 1-foot high flashboards at the Eagle development, with the related FERC order describing the facility as a *"concrete gravity dam containing a 185-foot long ogee spillway topped with one-foot-high flashboards…."* Erie believes that the Eagle dam flashboards are helpful in moderating fluctuations in the level of Beaver Lake.

Operationally, the Moshier development releases flows that are received from upstream and works to coordinate those flows with the Eagle development below Beaver Lake. Whether these flows are released through the Moshier turbines or spilled over the dam, the flows received at Moshier must pass through Beaver Lake. Erie's water resource engineers work in cooperation with Stillwater Reservoir engineers to smooth flows as much as possible; however, if the Stillwater Reservoir must release flows, as determined by the Hudson River Black River Regulating District (the "HRBRRD"), the flows will ultimately pass through the Moshier development and through Beaver Lake. Additionally, Stillwater releases do not necessarily correspond directly to precipitation events and in fact may occur to supplement flows downstream, so residents unaware of how the river system is managed may at times be surprised to see increasing lake levels during times of low precipitation.

In managing flows into Beaver Lake, Erie is confronted with certain natural and legal limitations affecting its operations and ability to manage fluctuations in Beaver Lake levels. First, as mentioned above, while Erie and Stillwater engineers consult regularly on release of flows from the Stillwater Reservoir, ultimately, Erie has no control over those releases and must manage the flows it receives at Moshier as best it can. Second, while a majority of the flow into the Moshier impoundment comes from Stillwater Reservoir, again as mentioned above, some uncontrolled flow is received from Moshier Creek. Third, during precipitation events, natural uncontrolled tributaries downriver of the Moshier impoundment contribute material flows into Beaver Lake. Fourth, under its current FERC license, Erie is limited to the storage it can create at the Moshier dam within the Moshier impoundment, and, similarly, to the storage it can create at the Eagle dam within the Eagle impoundment. While Erie makes its best efforts to manage flows, during periods of high river flow, whether related to precipitation events, increased flows from the Stillwater Reservoir or both, Erie must make releases from its Moshier and/or Eagle dams when such storage capacities are consumed. Lastly, while Erie's FERC license limits daily and seasonal reservoir fluctuation at the Eagle dam to a 1.0-foot band between elevations of 1,425.2 and 1426.2 ft with flashboards installed and between elevations of 1,424.2 and 1,425.2 ft without flashboards installed, such limits do not apply during periods of transmission interruption, equipment failure or emergency, or when river flows exceed the hydraulic capacity of the Eagle facility. So, for example, fluctuations above those limits are permitted under the license when river flows exceed such hydraulic capacity, which can be expected to occur periodically, including as a result of releases from Stillwater Reservoir (which as mentioned may be unconnected to precipitation events).

Beaver Lake Topography and Eagle Dam Flashboards

Erie's archives also include records documenting certain challenges posed by Beaver Lake's topography and the origins of the flashboards installed at Eagle dam. For example, a letter dated October 3, 1977 from Niagara Mohawk Power Corporation to Richard Hough documents that (1) the flashboards on Eagle dam were installed at the request of property owners to increase recreational use of the lake and (2) that the outlet of Beaver Lake is a narrow V-

shaped outlet, which ordinarily constricts outflow of water from Beaver Lake. In addition, Erie is in possession of a USGS map dated from 1912 (see attached) that shows the natural constricted elevation of Beaver Lake at approximately 1,425 ft, and the fact that a lake existed at that time, prior to the construction of Eagle dam downriver, shows conclusively that there is a natural restriction on outflow. Erie notes in this regard that the area depicted in the map included as Attachment #1, which map was included with the Hough Letter, while perhaps wide, is not very deep, thus resulting in a restricted cross-sectional area impeding Beaver Lake outflows. Thus, the map may be indicative of areas that would be generally above, or barely below, water at the lower Eagle reservoir levels that would result from removal of the flashboards.

Turning to the Appeal Letters themselves and the specific concerns raised about high water levels and flooding:

1. Erie does not understand the concerns raised in the Appeal Letters about "high water levels." Under its license, Erie is required to maintain levels at Eagle dam under normal conditions within a specific 1-foot band, which it does. Such levels are not in general any "higher" than have historically occurred. However, Erie notes again that such levels may be permissibly exceeded from time to time during periods of transmission interruption, equipment failure or emergency, or when river flows exceed the hydraulic limits of the Project, as does happen from time to time. With respect to the Moshier and Eagle facilities, this can happen due to uncontrolled flows into the Moshier pond or Beaver Lake (i.e., rain or snow melt) and/or releases from the Stillwater Reservoir, which are not within the control of Erie.

2. Erie strongly disagrees with allegations or suggestions that the Project creates flooding or fluctuation in Beaver Lake levels in violation of its license. In accordance with its license, Erie successfully maintains water levels within the 1-foot band specified in its FERC license, except of course for those periodic episodes where those license limits do not apply, such as when river flow exceed the hydraulic capabilities of the relevant Project elements. As described above, these periodic episodes of high flow result from events beyond Erie's control, including rainfall events and releases from Stillwater Reservoir, which occur at the discretion of HRBRRD subject to its own operational requirements.

3. The Hough letter makes specific reference to certain events occurring December 10, 2018 and suggests that they were the result of mismanagement by Erie. In fact, these events occurred between December 2, 2018 and December 21, 2018, at which time the Eagle station was out of service for a major electrical rehabilitation, as scheduled with the NY-ISO. During this outage a high inflow event occurred as a result of 1.93" of precipitation combined with mild temperatures, which resulted in additional flow contributions from snow and ice melt. Erie is willing to discuss with Mr. Hough and other residents the handling of those events and whether there were ways that any adverse effects could have been mitigated, including opening the sluice gate at Eagle dam. However, Erie notes that by its calculations, opening of the sluice gate at Eagle dam during those events would have offered only a modest drop in the elevation of the Eagle pond, and unknown impact at Beaver Lake.

Concerns Regarding Lack of Representation on BRAC and Failure to Engage with Residents

Erie also disagrees with suggestions that it has failed to engage sufficiently with residents regarding concerns about Project operations and fluctuations in lake levels. Again, historical records show that owners and operators of the Project have engaged over the decades in ample discussions and meetings with Beaver Lake residents. Substantial discussions occurred at the prior re-licensing of the Project in 1996.

Nor were such efforts limited to the past. Representatives of Erie discussed Project emergency action operations with approximately ten residents during a meeting on November 15, 2018 in Croghan, NY. After the meeting, Erie representatives listened to questions raised by the residents concerning water levels in Beaver Lake. Erie staff indicated their willingness to schedule further meetings with Beaver Lake residents in 2019. In addition, prior to LIHI receiving the Appeal Letters in December 2018, Erie was planning an on-site meeting with Beaver Lake residents to discuss reinstalling a staff gauge at Beaver Lake to assist with monitoring lake levels. Erie remains committed to assisting Beaver Lake residents with installing a staff gauge or similar equipment in 2019.

It is not necessary for special representation to be given to Beaver Lake residents within BRAC. The interests of local residents, including Beaver Lake residents, are already amply represented through the participation within BRAC by the Town of Watson, the New York State DEC, the Adirondack Park Agency, the United States Fish & Wildlife Service and Lewis County. The adequacy of this representation is demonstrated, for example, by the USGS report commissioned in 1999, which resulted in no small part due to the concerns of Beaver Lake residents as expressed through those local and state BRAC participants. Furthermore, Erie notes that BRAC's governing documents specifically allow for community residents to attend BRAC meetings.

Erie notes that the LIHI recertification will impose a condition on Erie to discuss with BRAC and other agencies the concerns brought forth by Beaver Lake residents. Following recertification, Erie intends to have open meetings with land owners and residents in the vicinity of Beaver Lake to discuss concerns they have and to make good faith efforts to find ways to address those concerns, subject of course to the natural, practical and legal constraints that the Project must operate under.

Erie remains cognizant of the well-known hydraulic challenges associated with Beaver Lake and will continue to exercise diligence and prudence in managing the Project (including the Moshier and Eagle dams) to maintain compliance with its license and all other applicable legal requirements. As discussed, LIHI's draft certificate contains a condition requiring that Erie examine the concerns of Beaver Lake residents in respect of Project operations, and work in good faith to find relief if possible. Erie recognizes those efforts must involve engagement with such residents.

Erie trusts this reply clarifies the specific concerns directed to Erie's operations and infrastructure. Erie remains hopeful LIHI will grant its certification and allow Erie to demonstrate its commitment to working with Beaver Lake residents.

Respectfully

Daniel Maguire, PE
Compliance Manager
Atlantic Operation

Attachment(s):

Attachment 1 – Map from Hough Letter
Attachment 2 – Excerpt from State Water Supply Commission Report from 1910
Attachment 3 – Letter dated October 3, 1977 from Niagara Mohawk Power Corporation to Mr. Richard R. Hough
Attachment 4 – Portion of 1912 USGS map showing Beaver Lake at Elevation 1425 in its natural pre-dam state.

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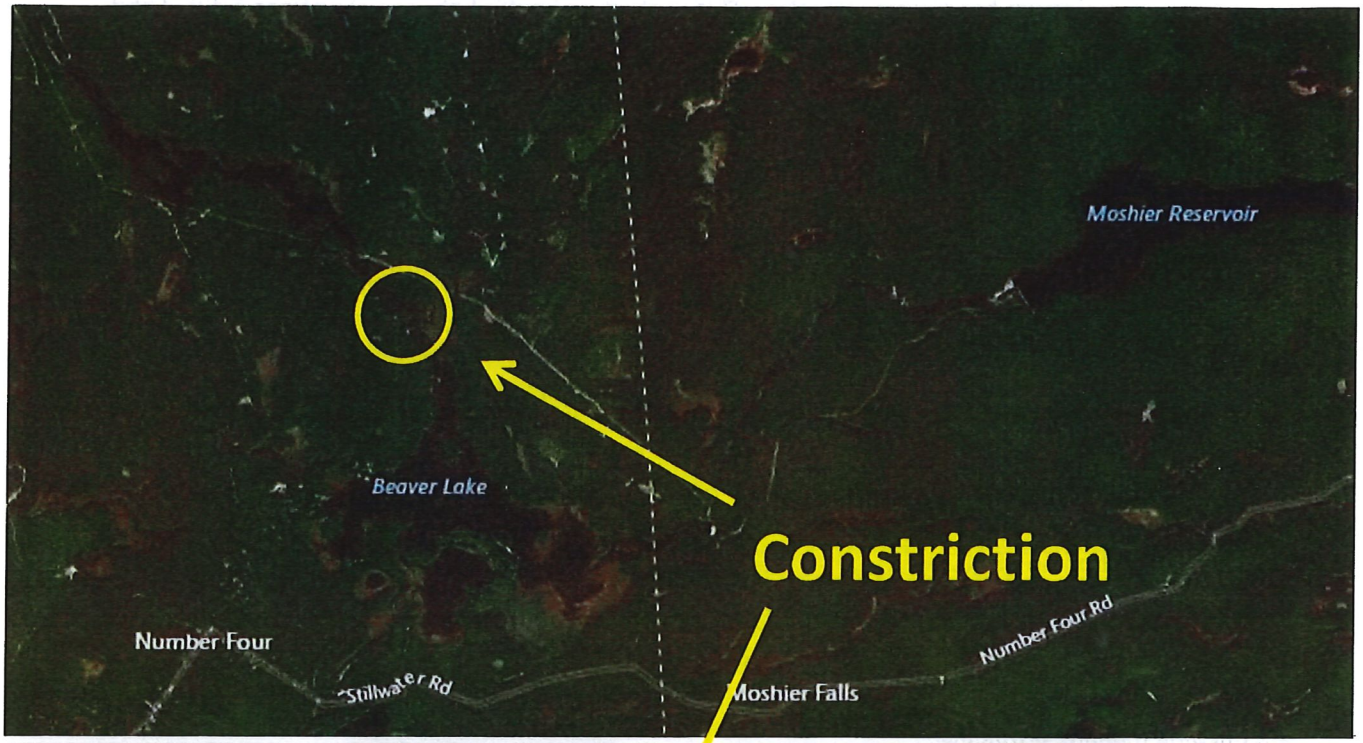
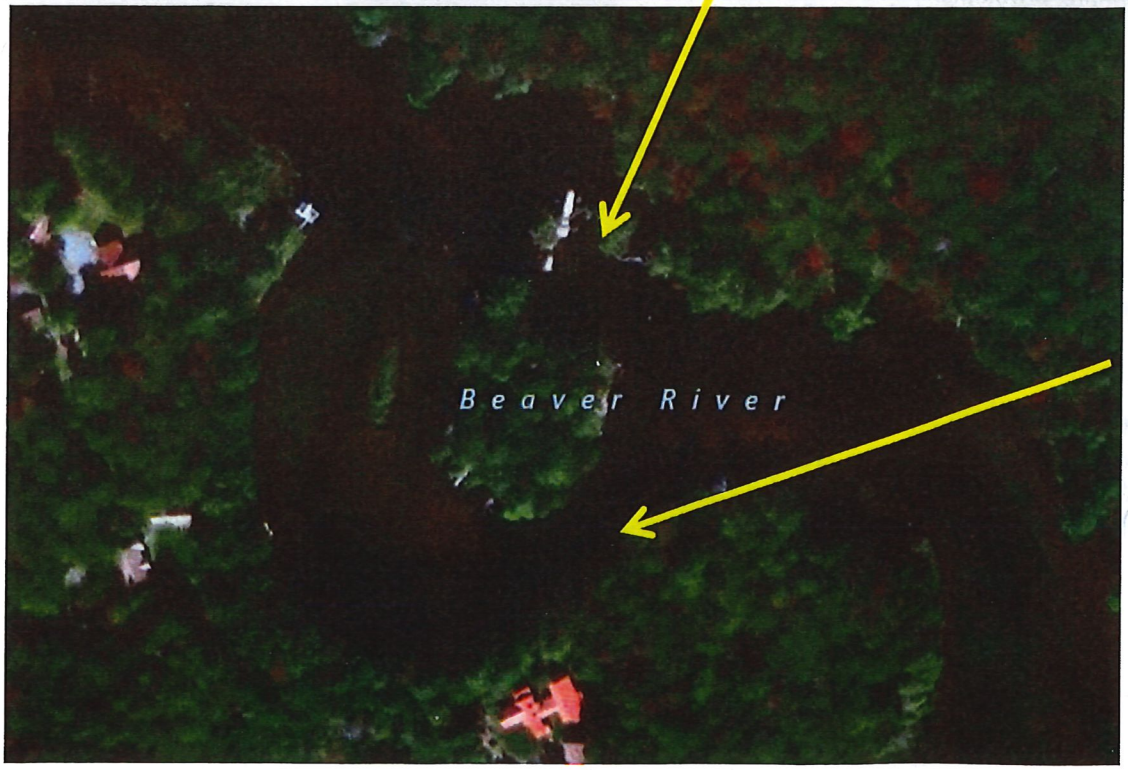
72 Nashua Rd.
Windham, NH 03087

Attachment #1





Water easily flows around this constriction and so it is not relevant to Beaver Lake property owners' concerns in regard to flooding.

time. By this means there would be no need of taking into account any flooding due to high water, as the level of the lake would be maintained at a constant maximum, namely, the crest of the dam. Not more than 2,830 acres of land in addition to that already under water would be thus flooded, all State land within the Adirondack Park. Of the 2,830 acres, the larger part is already treeless or swampy, and not more than 630 acres, which lies on steep hillsides along the shore of the present flow, contain timber of any value, and much of this is already flooded frequently by high water with considerable damage to forest growth. By still further increasing the height of the dam very much larger storage could be obtained. The area of the watershed at this point is 215 square miles which would warrant greater storage capacity. If upon further study and examination they should prove feasible, from a general examination of the site, I should say that this increased storage could be obtained without any material increase in the amount of State land needed, but, however, would probably necessitate some relocation of the line of the Adirondack division of the New York Central Railroad between Beaver river and Brandreth Station. At Beaver lake, or No. 4, by building a low dam six feet high at its outlet, about 1,000 acres of swamp land could be flooded. This land is at present flooded at high water which is about six feet above the present normal level of the lake. Thus six feet of storage, amounting to approximately 0.4 billion cubic feet, could be obtained without flooding any land that is not already flooded at times of high water. By increasing the height of dam at the outlet of the lake, this storage could be very largely increased. It is impossible to say to what extent additional land would be flooded without a topographical survey, but I should say without doubt the increase to the flooded land would be very small in comparison to the increase in storage, as the first six feet of flooding would cover most of the low swamp ground about the shores of the lake. It will hardly prove desirable to build both of these reservoirs provided either one of them is constructed so as to come reasonably close to the capacity of the watershed at this point. However, it will prove desirable in case all the storage needed cannot be obtained at Beaver Flow

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

300 ERIE BOULEVARD, WEST
SYRACUSE, N.Y. 13202

October 3, 1977

Mr. Richard R. Hough
Van Beuren Road
Morristown, New Jersey

Re: Beaver Lake

Dear Mr. Hough:

This is in response to your September 23, 1977 letter with regard to the above matter.

Frankly, I am somewhat confused over the fact pattern you have presented. In your August 27, 1977 letter you indicated that "over the past two years the average level of Beaver Lake has been high". In this latest letter you note that "during the last two years in spite of the heavy rainfall, the lake has fallen to levels far lower than any I have experienced in the last 20 years".

Be that as it may, whether the problem is high water, low water or fluctuation in water level, Niagara Mohawk has only two sources of input into the problem: 1) the flashboards at Eagle Falls plant, and 2) the operation of Eagle Falls and Moshier plants.

Flashboards were placed on the Eagle Falls plant at the request of the property owners to increase the recreational use of Beaver Lake. The flashboards add approximately one foot to the water level of Beaver Lake. The flashboards are static. They cannot be employed as a means of regulating the water level. Once in place, they must remain in place. As your September 23, 1977 letter indicated a concern for low water levels, it would not appear to be to your advantage to discontinue use of the flashboards.

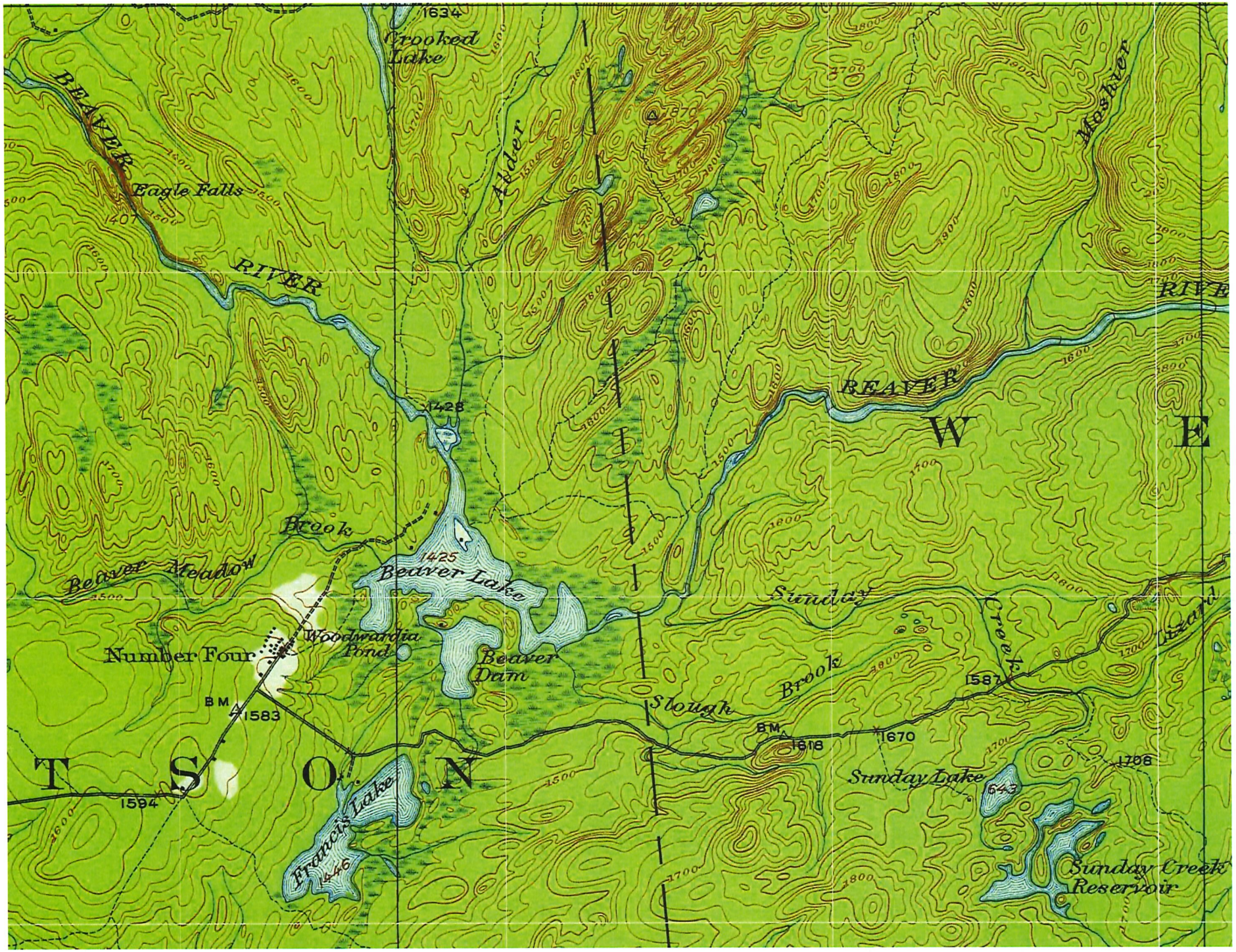
The operation of the Eagle Falls and Moshier plants adds approximately six inches to the natural water elevation of Beaver Lake. Any variation in elevation beyond six inches must be attributed to natural causes beyond the control of Niagara Mohawk. A review of the data supplied by our hydro operating staff does not corroborate the dramatic fluctuations in water level eluded to in your correspondence.

As I indicated earlier, the natural geography of Beaver Lake contributes in large measure to the variation in water elevation. Beaver Lake is a relatively shallow lake with a narrow outlet. Outflow from Beaver Lake is especially constricted during low water while high water empties at a faster rate. This is due to the natural configuration of the outlet of Beaver Lake which is roughly in the shape of a "V". In addition, Alder Creek and Sunday Creek empty directly into Beaver Lake. The flows in these creeks are unregulated and subject to fluctuations in rainfall.

Lastly, I must again point out that even in its pristine condition, without Eagle Falls plant, Moshier plant and Stillwater Reservoir, Beaver Lake had a natural fluctuation in water level of up to six feet.

Very truly yours,

John H. Terry
Vice President General Counsel
and Secretary



USGS 1912 MAP