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Carbon Zero LLC
P.O. Box 338 • North Bennington, Vermont 05257 • 802.379.2469

Re: FERC project #P-14308-001—VT
Vermont Tissue Mill Dam Hydroelectric Project
Carbon Zero, LLC

December 22, 2015

VIA ELECTRONIC FILING

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

Re: Vermont Tissue Project-FERC# P-14308-001
1. Amendment to prescribed bypass flows

Dear Secretary Bose,

The Vermont Agency of Natural Resources (VTANR), with Carbon Zero, LLC, has completed the post commissioning bypass flow study for the secondary spillway at the Vermont Tissue Hydroelectric Plant on the Walloomsac River in Bennington, Vermont. In summary, the Agency finds that the fourth of five observed flow conditions meets the State's environmental requirements for bypass flows. As such, the flow required for the secondary bypass is revised to 15 cfs. The weir in this spillway will be permanently modified such that flow through the weir will have a lowest point that matches that of Test 4 (554.362 msl) and allow flow through the weir of approximately 8.7 cubic feet per second which, when combined with the spill over the dam crest of 6.5 cfs will satisfy the required bypass flow.

Attached please find the report prepared by VTANR. Should you have any questions or require further information, please let us know.

Respectfully,

William F. Scully
December 22, 2015

CC: Gerald Cross (D2SI)
Jeff Crocker (VTANR)
Rod Wentworth (VT Fish and Wildlife)
Melissa Grader (USF&W)

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EXHIBIT A

Vermont Agency of Natural Resources Assessment and Report

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VT Tissue Hydro – Secondary Channel Flow Assessment and Report

Rod Wentworth, December 9, 2015

Jeff Crocker and I met with Bill Scully on November 2, 2015. The purpose of the trip was to observe and assess a range of flows in the secondary bypass channel in terms of aquatic habitat. We implemented a study that we have prepared in October; it is appended to this document. As stated in the study plan, the bypass flow should provide the following conditions:

1. Connectivity to prevent stranding.
2. Water velocities suitable to juvenile and adult trout and minnow species (0.5-1.5 feet/second feeding lanes with cover nearby).
3. Faster velocity plume where water enters pools, so as to create a mix of habitat conditions: fast water next to slow water, the creation of eddies and water circulation throughout.

Five flows were observed. These flows were provided by adjusting the height of stop logs in the weir opening on the left side of the dam for the secondary channel. The project PLC was set to hold the pond level constant, at about one inch higher than the dam crest. This is supposed to be the normal setting, so the discharge into the channel consists of this crest spillage plus the weir discharge.

We started with the highest flow and then observed successively lower flows. Bill took measurements of the height of the stop logs and estimated the total discharge into the channel for each flow. Discharge was estimated on-site during the assessment, and Bill provided us his final calculated estimates the next day. Both are shown below. Precision is likely not more than to the nearest cfs at best.

Assessment Flow #	Discharge into Secondary Channel (cfs)		Approximate Observation Time (EST)
	Estimated on site	Calculated	
1	24	24.67	1125
2	21	21.76	1230
3	18	18.78	1315
4	15	15.25	1420
5	12	12.12	1515

We waited at least 30 minutes or so for flow conditions in the channel to stabilize after each change in the stop logs, before making our observations and taking photos.

Upon the completion of the assessment of flow #5, we returned to the dam and noted, as did Bill, that the spillage over the dam had decreased. We did not notice any such change previously and believe that the change occurred only during the final assessment. As such, the flow that we observed and assessed may have been less than 12 cfs and may not have been stable during the observations. We asked Bill to send us the data for the pond level versus time for the period around and including this observation. The time of these observations was about 1515, although we may have started 5-10 minutes before that.

The photos for the flows include a time stamp that indicates when they were taken. Flow #5 was assessed first at Transect 2 (T2) and then at T1, with the T1 photos being taken after the T1 assessment observations and notes. Videos were also taken and do a much better job than still photos of showing the water movement.

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Note that the time stamps on the photos I took are not correct. The time changed from DST the EST on November 1 and in addition, the camera clock was a bit off. **The time stamp on each photo must have 1 hour and 15 minutes subtracted from it to be convert to the correct time.**

My hand-written field notes from the assessment are included in a separate PDF file.

The channel consists of a ledge cascade immediately downstream of the dam that extends about 40 feet downstream, ending at the upstream side of the bridge. The cascade spills into a pool that extends downstream nearly 100 feet. The pool consists primarily of ledge substrate. The pool hydraulic control is ledge, over which the water spills and drops about one foot in elevation. This next section and the remainder of the channel is a riffle with predominantly boulder substrate but also including ledge and cobble. Structurally it is excellent fish habitat, with a good diversity of structure and hence flow conditions such as fast water next to slower water, and aerated tongues of water flowing down between boulders. This structure is obvious in the photos. This riffle blends into the main channel where the two come together.

We located two transects in the riffle stretch. We measured wetted width at each transect for each flow. We also took photos from each transect (from near right shore), as well as from the pool and looking downstream from on the bridge.

The secondary bypass is about 250 feet long. The approximate transect locations are shown in the image as red lines. Transect 1 is the more upstream of the two. The distance between the two transects was about 60 feet.

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The wetted widths measured at each flow are shown in the following table.

	Wetted Width (feet)	
Assessment Flow #	Transect 1	Transect 2
1	50.0	60.6
2	50.0	60.2
3	49.8	59.9
4	49.3	58.4
5	48.5	57.2

These did not change a great deal. For the most part, velocities did not change a lot either since decreases in depth resulted in more confined spaces between boulders. Depth was the most noticeable change. In the pool, velocities noticeably decreased at the lower flows. Fast water plumes entering slower water areas and their associated white water decreased with flow as is evident in the photos.

Each flow was photographed looking downstream from the bridge. This perspective provides the best overview. Photos for flows #1, 3, 4 and 5 are attached to the end of this report. The videos provide a better understanding of changes in water circulation and current and are important to interpretation of the flows. If one compares the photos for flows #1 and 5, there is a noticeable change. The last flow observed (#5) was unacceptable and did not provide high quality habitat conditions. Depths had become too shallow and numerous locations and water velocities were also in adequate.

There are two large tongues of faster whitewater in the bypass, where the falls enters the pool just upstream of the bridge and at the outlet of pool. These tongues provide cover for fish but also create areas of fast water near slow water that can serve as feeding lanes for fish. In addition, the quantity of water entering the pool influences the water velocity and circulation in the pool and as a result its habitat value. Flow #1 provides velocities that are suitable for juvenile and adult trout. The quality of the habitat in the pool decreased somewhat with each assessment flow. Flow #4 was judged to still provide high quality habitat but was just barely still acceptable. Flow #5 clearly was not acceptable. The pool was too quiescent and lost the broken or rippled water surface found at higher flows. This type of water surface provides cover for fish. The diversity of velocity conditions was inadequate at Flow #5.

The water exiting the pool provided an attractive tongue of water that was too diminished at Flow #5. A similar condition exists where water passes over ledge near transect 2.

Water depths in the bypass decreased with each successive flow assessed. In comparing the Flow #1 and Flow #5 photos, the bypass is shrinking to shrinking. A rocky area near the confluence with the main channel (left side) is essentially dewatered at Flow #5, and an area between the two transects (right side) was reduced to a depth of about two inches. This area showed a noticeable decrease in depth beginning with Flow #3.

In summary, Flows #1 and #2 looked very good. Both Flow #3 and #4 looked good; Flow #4 was shallower but still met the assessment criteria. Flow #5 exhibited several unacceptable conditions as described. The flow requirement for the secondary bypass channel can be revised to 15 cfs.

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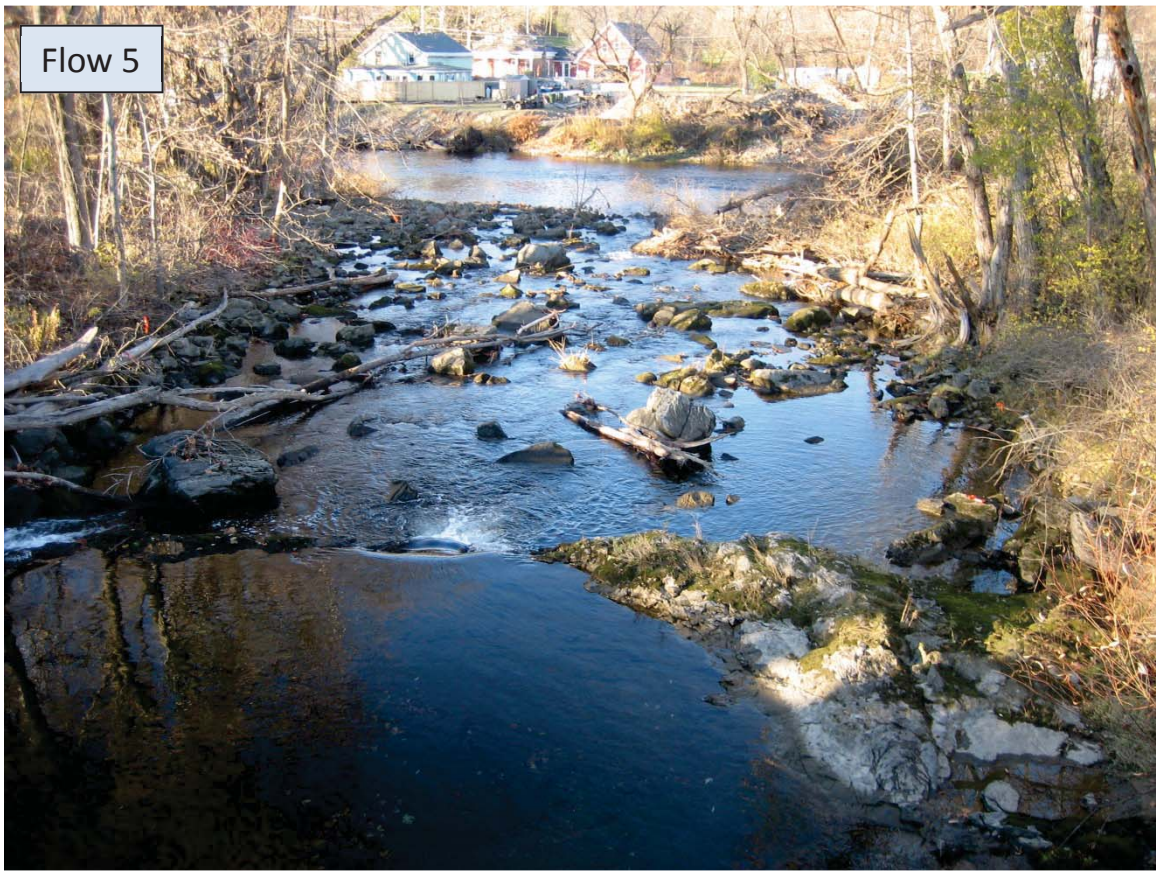

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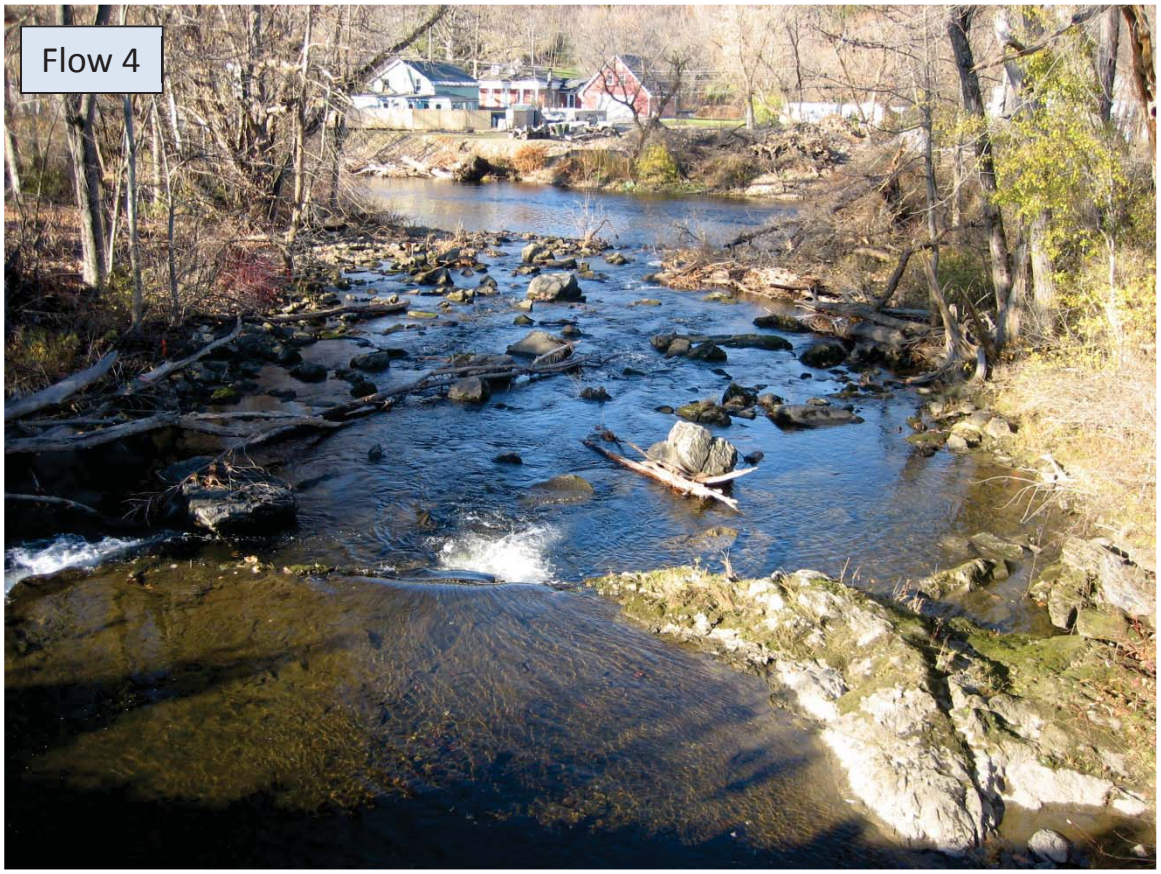

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Vermont Tissue Secondary Bypass Channel Habitat-Flow Needs Assessment
October 9, 2015 – ANR Study Plan

The purpose of this assessment is to determine the year-round conservation flow needed in this channel to provide suitable habitat conditions for fish and other aquatic life. This will be achieved by observing and characterizing a series of demonstration flows, as described below.

The secondary bypass channel contains high quality pool habitat. A flow that maintains suitable habitat conditions on a year-round basis is necessary. Conditions should include the following:

1. Connectivity to prevent stranding.
2. Water velocities suitable to juvenile and adult trout and minnow species (0.5-1.5 feet/second feeding lanes with cover nearby).
3. Faster velocity plume where water enters pools, so as to create a mix of habitat conditions: fast water next to slow water, the creation of eddies and water circulation throughout.

The left channel is mostly devoid of gravel and does not appear to have suitable spawning substrate for trout, except in the vicinity where it converges with the other two channels. However, this portion of the channel also receives flow from the middle channel. Therefore, the additional seasonal standards for spawning and incubation are not necessary in this channel.

The flow requirement included in the 401 for this channel is 24 cfs. The Department observed this flow on 6/30/2010 and found it provided suitable habitat conditions.

A Department of Fish and Wildlife biologist will observe each assessment flow and take qualitative notes which will then form the basis for decision making. Visual observations on depth, velocity, current patterns will be made. Wetted width will be measured at 3-4 set locations.

Still and video photos will be taken in the bypass at each flow and from several fixed observation points.

Target assessment flows: approximately 10, 13, 16, 19, and 22 cfs. The target weir discharge (depth) needed to result in each of these flows will be calculated and used to provide each flow.

Observations will begin after each target flow release in the channel has stabilized. The depth of water in the weir will be measured and recorded before and after each flow is assessed. Calculate the discharge using the weir equation. At a later date, the final flow determined to be necessary can be measured to verify the estimate.

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