The State of New Hampshire
Department of Environmental Services
Thomas S. Burack, Commissioner

Celebrating 25 Years of Protecting New Hampshire's Environment

January 14, 2013

Fred Ayer, Executive Director
Low Impact Hydropower Institute
34 Providence Street
Portland, Maine 04103

RE: Water Quality Status of the Salmon Falls River for Low Impact Hydropower Institute Certification of the Milton Hydroelectric Project (FERC No. 3984), Salmon Falls River

Dear Fred:

Essex Hydro Associates (EHA) has applied on behalf of SFR Hydro Corporation for Low Impact Hydropower Certification from the Low Impact Hydropower Institute (LIHI) for the Milton Hydroelectric Project (FERC No. 3984) on the Salmon Falls River in Milton, NH. We understand that to receive LIHI certification, you require a statement from the New Hampshire Department of Environmental Services (DES) stating that the project is not causing or contributing to violations of state water quality standards. On May 24, 2012, DES sent EHA a letter stating what would be needed to determine if the Salmon Falls River in the vicinity of the Milton Hydroelectric Project was or was not attaining water quality standards. In specific, the following was stated: "In order for DES to determine if the subject hydroelectric project is causing or contributing to water quality standard violations, additional monitoring and information is needed. In general, data / information is needed to address the following water quality concerns that are typically associated with hydropower projects:

1. Impact on ambient water quality criteria and thresholds;
2. Impact of pond fluctuations on aquatic habitat;
3. Maintenance of adequate minimum flows to protect downstream aquatic life; and
4. Adequate upstream and downstream fish passage."

The purpose of this letter is to provide you with our assessment of data and information received from EHA in response to our letter of May 24, 2012 and, our conclusions as to whether or not the Milton Hydroelectric Project is causing or contributing to New Hampshire surface water quality standard violations in the Salmon Falls River.

With regards to water quality, EHA collected water quality data for dissolved oxygen, water temperature, total phosphorus, chlorophyll-a, and discharge. Monitoring locations in the impoundment (23-SFR), the bypass reach (22-SFR) and in the downstream section of the river (21-SFR) were monitored continuously for a 10 day period in July 2012 for water temperature and dissolved oxygen using multi-parameter dataloggers. DES specified that the multi-parameter continuous water quality data should be collected under critical low flow/higher water temperature conditions. There is no USGS stream gage in the Salmon Falls River watershed so DES assigned the USGS stream gage on the Oyster River in Durham as a surrogate to estimate low flow conditions in the vicinity of the project. The continuous water quality data submitted by EHA was collected when the Oyster River was flowing below or just above the 3 x 7Q10 conditions of 1.5 cfs. During the collection of the continuous water quality data, daily average water temperatures in the Salmon Falls River exceeded 23° F. EHA has stated that during the collection of the continuous water quality data the Milton Hydroelectric Project was operating under normal operating procedures.

Instantaneous measurements were taken in the impoundment (23-SFR) for water temperature and dissolved oxygen at one foot depth intervals. This data confirmed that the approximately 10 foot deep impoundment is not stratified during the summer months. In addition, between June and August 2012, ten samples from stations 23-SFR and 21-SFR were collected and tested for total phosphorus and chlorophyll-a.

DES has assessed the water quality data collected in 2012, and based on this assessment concludes that the water quality in the impoundment, bypass reach, and downstream section of the Salmon Falls River, under the dam's current operating conditions, does not appear to be violating existing water quality criteria or thresholds for dissolved oxygen, phosphorus and chlorophyll-a. In the May 24, 2012 letter DES provided the assessment status for the parameters of concern for the reaches of the Salmon Falls River upstream and downstream of the Milton Hydroelectric Project. Table 1 provides an update to the current assessment status of the river reaches in question for the parameters collected this summer. Our assessments were based on the methodology described in the DES Consolidated Assessment and Listing Methodology (CALM)[1]. This information will be used in the next Section 305(b)/303(d) Water Quality Assessment report which is expected to be issued by DES in early 2014. Please note that the assessment status listed in Table 1 could change if water quality criteria or thresholds change and/or if additional data collected between now and the 2014 report indicate water quality violations. For example, data collected at lower flows and/or higher temperatures might result in a different assessment.

Table 1. Assessment Status for Water Quality Monitoring Parameters - Milton Hydroelectric Project

Assessment Unit and Monitoring Station	Location	Parameter	Designated Use	Assessment Status based upon summer 2012 sampling
NHIMP700030507-09 23-SFR	Milton Hydroelectric Dam Impoundment	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Saturation)	Aquatic Life	Fully Supporting
		Chlorophyll-a	Primary Contact Recreation	Fully Supporting
			Aquatic Life	Indeterminate[A]
		Total Phosphorus	Aquatic Life	Indeterminate[A]
		Water Temperature	Aquatic Life	No numeric criteria[C]
NHIMP700030507-06 22-SFR	Downstream of Milton Hydroelectric Dam – Bypass Reach	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Saturation)	Aquatic Life	Fully Supporting
		Water Temperature	Aquatic Life	No numeric criteria[C]
NHIMP700030507-06 21-SFR	Downstream of Milton Hydroelectric Dam Bypass Reach - Downstream of Powerhouse – Upstream of Spaulding Pond	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Saturation)	Aquatic Life	Fully Supporting
		Chlorophyll-a	Primary Contact Recreation	Fully Supporting
		Total Phosphorus	Aquatic Life	No numeric criteria[B]
		Water Temperature	Aquatic Life	No numeric criteria[C]

[1] 2012 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology. New Hampshire Department of Environmental Services. NHDES-R-WD-10-3. February, 2010. Available at http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/2010calm.pdf.

[A] DES does have numeric water quality thresholds for the aquatic life designated use for total phosphorus and chlorophyll-a in lakes/ponds and impoundments with characteristics similar to lakes/ponds but it can only be applied to waterbodies where the tropic class is known. For waterbodies where the trophic class is known the median total phosphorus and chlorophyll-a value is used to make the threshold comparison. The aquatic life designated use nutrient and chlorophyll-a thresholds are depicted below with the median values for each parameter for the data collected at station 23-SFR in assessment unit NHIMP600030405-02 and station 21-SFR in assessment unit NHRIV600030405-03 during the summer of 2012.

	TP (ug/L)	Chl-a (ug/L)
Median 23-SFR (2012)	**10**	**2.22**
Median 21-SFR (2012)	**10**	**2.47**
Oligotrophic	< 8	< 3.3
Mesotrophic	≤ 12	≤ 5
Eutrophic	≤ 28	≤ 11

[B] DES does not have numeric water quality criteria for nutrients in rivers or streams. The narrative criteria states that "Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring."

[C] Although there is currently no numerical water quality criteria for water temperature, NHDES is in the process of collecting biological and water temperature data that will contribute to the development of a procedure for assessing rivers and stream based on water temperature and its corresponding impact to the biological integrity of the waterbody.

EHA provided DES with a detailed description of the infrastructure of the facility. Project works consist of:

- a 164 foot long concrete gravity crib dam which is 16.4 feet high at its highest point,
- a six foot six inch diameter 3,800 foot long steel penstock,
- an approximately 4,600 foot long bypass reach,
- a power house located in the former Spaulding Fiber Company Mill,
- three turbines – (Units No. 1 and 2 are located in the Mill Building No. 1 while turbine Unit No 3. is located in the adjacent Mill Building No. 2. Mill Building No. 1 is considered the primary powerhouse with the controls and electrical cubicles situated within), and
- individual draft tubes associated with each generating unit which discharge flow into a common tailrace.

In December of 2012, EHA provided DES with information regarding minimum flows and pond fluctuations at the Milton Hydroelectric Project. EHA confirmed that the facility is operated as a run of river project and that the project does not draw down the impoundment or store water for purposes of power generation. Any pond level fluctuations are solely the result of natural conditions in the Salmon Falls River and inflow equals outflow at all times.

With regard to minimum flow in the bypass reach, the project's FERC license requires a minimum flow of 25 cfs. The project currently maintains a minimum flow of 58 cfs in the bypass reach. The project uses a waste gate in combination with water passed over the dam to maintain a minimum flow of 58 cfs in the bypass reach. The U.S. Fish and Wildlife Service (USFWS) and New Hampshire Fish and Game (NHFG) have indicated that they support the 58 cfs minimum flow in the bypass reach as adequate for achieving acceptable habitat conditions. A minimum flow of 58 cfs is approximately equal to a yield of 0.5 cfs/sq. mile multiplied by the upstream drainage area.

Regarding the issue of fish passage, EHA has provided documentation that SFR Hydro Corporation has agreed to terms provided by the USFWS. By October 1, 2013, SFR Hydro shall enter into, and provide LIHI and DES with a copy of an agreement reached between the USFWS, NHFG, and SFR Hydro for providing both interim and permanent downstream passage and permanent upstream passage for American eel. This agreement will include a description of the planned passage and protection measures and an implementation schedule for design, installation, and operations. These permanent facilities for downstream passage shall be in place and operational by August 1, 2015, and SFR Hydro shall notify

LIHI within two weeks of completion. Pending the agreement, SFR Hydro shall continue providing downstream passage by maintaining the exclusionary trash racks and passing eels through the opening in one sluice-gate during the period of August 15th to November 15th annually. In the event that the USFWS and NHFG determine prior to the installation of permanent downstream passage that the above-described interim downstream passage measure is not providing safe, timely and effective interim passage for out-migrating eels, SFR Hydro shall implement other reasonable interim measures as requested by these agencies.

During the term of LIHI certification, should a resource agency request implementation of passage measures at the Milton Hydroelectric Project for anadromous fish species, SFR Hydro shall so notify LIHI within 14 days and provide LIHI with a copy of the request and its response.

In summary, based on the current and agreed upon changes to the operation of the facility, current water quality standards, the water quality data collected in 2012 and information provided to DES by EHA, it appears the Salmon Falls River immediately upstream and downstream of the Milton Hydroelectric Project is attaining water quality standards at this time. As previously noted, however, this assessment could change in the future should a change in water quality criteria or thresholds and/or new data indicate water quality violations. It could also change if the DES, USFWS and/or NHFG conclude in the future that the project is not in compliance with upstream or downstream fish passage requirements or minimum bypass flow requirements.

Should you have any questions or require additional information please contact me at (603)271-2083 (ted.walsh@des.nh.gov).

Sincerely,

Ted Walsh, Surface Water Monitoring Coordinator
NH DES Watershed Management Bureau

Cc (via email): Steve Hickey, Essex Hydro Associates, LLC
Carol Henderson, NHFG
John Magee, NHFG
John Warner, USFS
Pat Mcilvaine, LIHI