Brooklyn Dam Hydroelectric Project

FERC Project No. 13806

Operation and Compliance Monitoring Plan (OCMP)

Submitted by:

Ampersand Brooklyn Dam Hydro, LLC

717 Atlantic Avenue, Suite 1A

Boston, MA 02111

1. Introduction

As required by the FERC License and Water Quality Certificate (WQC), Ampersand Brooklyn Dam Hydro hereby submits the Operation and Compliance Monitoring Plan (OCMP) including required information in compliance with the conditions of WQC Section: E-16, Operation and Compliance Monitoring Plan (OCMP).

A. A description of how the Project will be operated and maintained to comply with run-of-river and other requirements of the WQC

The Brooklyn Dam Hydroelectric Project consists of an existing 120- foot-long, 14-foot-high timber crib Brooklyn dam. The entire 120-foot length of the dam functions as a spillway and has a crest elevation of 878.73 feet. Adjacent to the dam is an existing 43-foot-long floodgate structure with four 6.9-foot-wide, 10-foot-high floodgates. With the existing 2.50-foot-high flashboards installed on the 120-foot-long spillway, the dam creates a 26-acre impoundment with a normal water surface elevation of 881.23 feet NGVD1929.

In addition to the dam and impoundment, the project includes an existing 100-foot-long, 45-foot-wide forebay, with three 15.2-foot-wide, 15.5-foot-high trash racks with 1.0-inch clear bar spacings.

When the project is operating, water will pass through the trash racks and forebay structure into the existing powerhouse, containing two new 300-kW Kaplan turbine generating units for a total installed capacity of 600 kW. Water from the turbines will be discharged into an existing 48-foot-long, 45-foot-wide tailrace.

Power will be transmitted through a new 100-foot-long, 480-volt underground transmission line connecting the powerhouse electrical panel to three new single-phased transformers. A new 300-foot-long, 35.4-kilovolt above-ground transmission line will transmit power from the transformers to the regional distribution grid.

The Brooklyn Dam Project will operate the project as a run-of-river mode, whereby outflow from the project equals inflow at all times, and water levels will be maintained at the top of the Flashboards or 881.23 and will not be drawn down for electric generation.

When operating, the project will flow water to the turbines through the forebay and will bypass a 100-foot-long reach of the Upper Ammonoosuc River directly below the dam crest, and water will return to the downstream below the powerhouse tailrace. The area directly below the Dam is flooded with water during normal operation by a downstream dam. When the turbines shut down, water spills over the dam flashboards. The turbine capacity is estimated now at less than 33 cubic feet per second (cfs) and a maximum hydraulic capacity of 315 cfs. At flows less than 33 cfs (the minimum operating capacity of the project), the project will not operate, and all flows will pass over the spillway or flashboards.

B. As-Built dimensions and elevations of all structures used to pass inflow from upstream to downstream of the dam including, but not limited to, the spillway (with and without flashboards), gates, and notches.

Enclosed please find the As-Built Drawings (as a separate PDF document), also submitted to FERC.

C. Procedures that will be implemented to comply with the conditions of WQC as quickly as possible should it be found that the Project is temporarily out of compliance, including notification of appropriate regulatory authorities.

The plant operator is the first person to see if the project is not complying with the conditions of the WQC, He visits the site at least once every day, and also monitors the condition of the site remotely by SCADA online.

If there is a potential compliance condition or emergency, he notifies Greg Cloutier, Operations Engineer, or John Chessman Northeast Ampersand Operation Manager. If there is an emergency water level change (e.g. flashboard repair), he directly notifies the officials below.

If the out compliance condition exists, Mr. Cloutier or Mr. Chessman will call Thomas Beno (at FERC-NY), Steve Doyon (at NH DES), and John Magee (at State of NH Fish and Wildlife) to discuss the appropriate corrective action(s).

If there is a scheduled impoundment lowering, Mr. Cloutier or Mr. Chessman will also notify to the Town of Northumberland.

D. Methods for monitoring, recording and reporting impoundment water surface elevations, inflows, bypass flows, turbine flows and when power is generated, with monitoring and recording of data automated and collected continuously to the extent feasible.

E. A description of the mechanisms and structures that will be used, including equipment accuracy, frequency of measurement, the level of automation and any periodic maintenance and/or calibration necessary to ensure the devices work properly.

The Brooklyn Dam is a fully automated hydroelectric plant. There are 2 PLC control units, one for each of the two 300 kw turbines. The PLC continually monitors the elevation of the impoundment using a 4-20 ma submersible water probe. The water probe is placed in a safe steel stilling well away from ice damage, which is heated. This water level probe makes changes to certain operating conditions, to start and stop equipment, and/or take flood control action.

For example, changes in water level due to rising water flows would cause to increase the opening of the two turbines output using the water flow to make electricity. If impoundment levels increase to critical levels, the PLC would start opening the 4 hydraulically controlled flood gates. The 4 gates each have % open instrumentation and provide the Plant Operator information of how and when the flood gates open.

On a falling water flow in the river, the PLC would reverse its action and close the flood gates and reduce electric generation with the objective of maintaining water levels at the top of the flashboards.

The PLC further records a CSV file of the Water Level and the output (in kWh) for each of the two turbines, which is recorded every 15 minutes. Upon request, the plant operator can save a report of the requested event. In addition to the PLC monitoring the plant operation, we have installed 4 internet accessible cameras that can provide the plant operator with real time conditions.

The primary control device is the water level probe. We expect some draft in its accuracy to +/- 0.1 foot. The target measurement is based on the top of flashboards which have a know elevation of 881.23' The operator uses this relationship for recalibration request.

Please see photographs of the PLC operating pages on the next page.

F. How data will be recorded to verify proper operations and how these data will be maintained for inspection by DES and other resource agencies for the life of the license.

The PLC monitors many items, and trends them for daily use by the operator. Photographs shown below of the Main Page (Photo 1.0) and the Trend page (Photo 2.0) may provide useful information for compliance reporting, and have been designed for day to day use.

The DES Compliance Report is a CSV report that is compatible with Excel Spreadsheet, which has the head pond elevation, and provides the generation of Unit 1 and Unit 2 (see Photo 3.0). We have also included a photograph of how the report can be generated (see Photo 4.0).

The data is stored on site by the Site SCADA computer.

G. A schedule for when the plan will be implemented.

This system was installed on January 5, 2016 and has been in operation since.

Photographs

Photo: 1.0 Main Page:

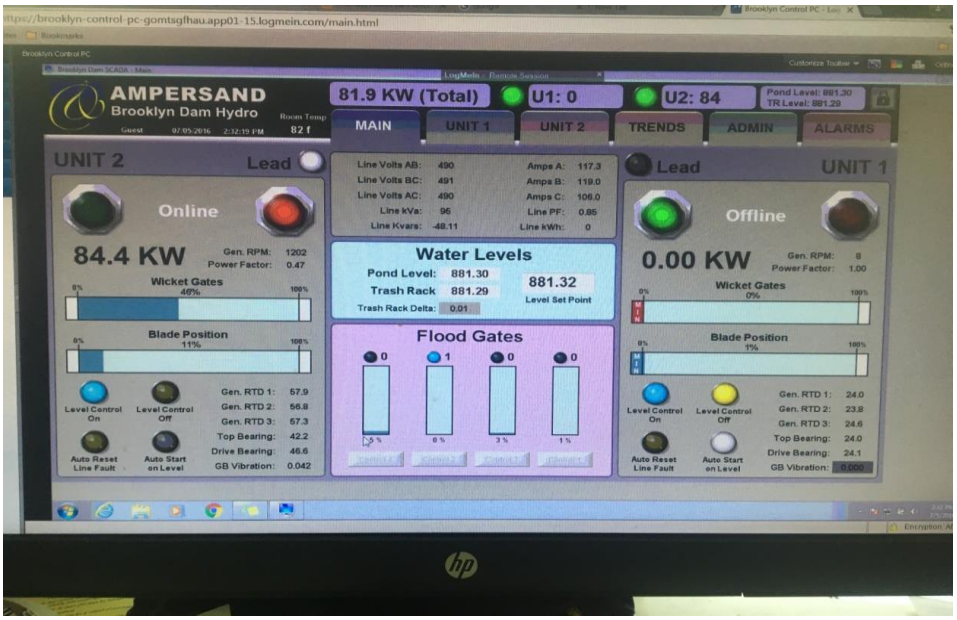

Photo: 2.0 Operator Trend Report

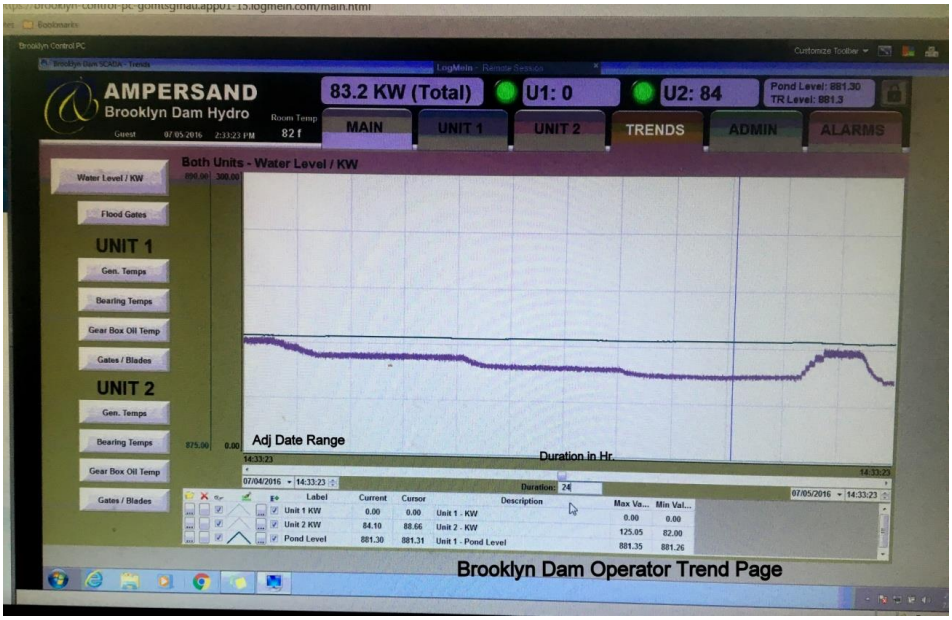

Photo 3.0 CSV Report for DES. Time interval 15 minutes

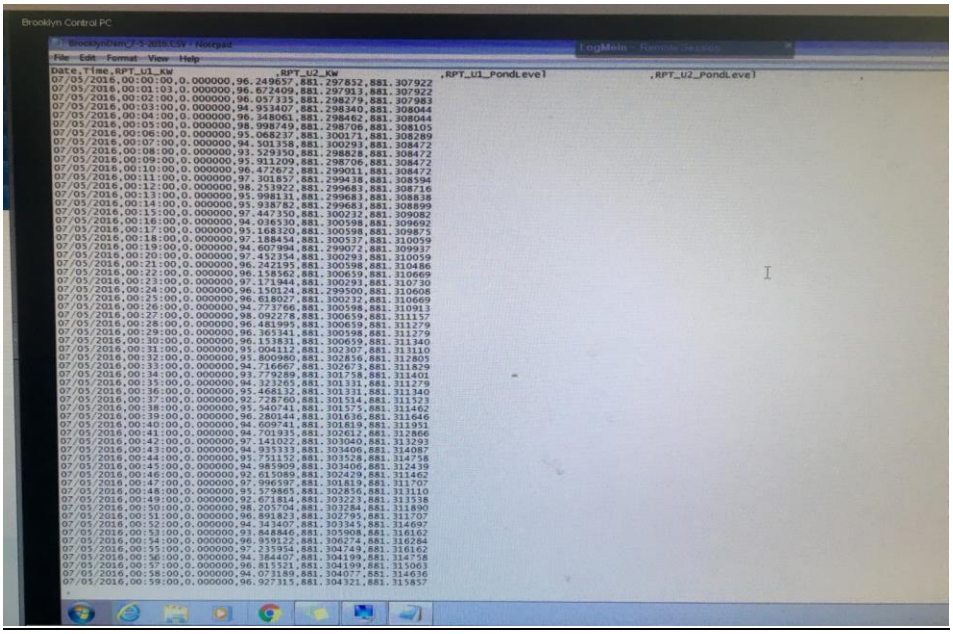

Photo 4.0 The Compliance Report Export page