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October 18, 2017

To: Wilderness Shores Implementation Team[1]

SUBJECT: 2017 Water Quality Monitoring Report

Hydro	FERC Project No.	NATDAM No.	License Article
Twin Falls	**11831**	**MI-00143**	**423**

In accordance with the FERC Order Amending License and Revising Annual Charges, dated September 27, 2013, Wisconsin Electric Power Company (d.b.a We Energies) is submitting water quality monitoring data collected during the 2017 monitoring season at the Twin Falls Hydroelectric project for your review and comment.

As described in the Wilderness Shores Settlement Agreement (WSSA), dated February 10, 1997, We Energies is required to ensure that flow releases from the Project maintain the state standards listed below when flows are greater than or equal to the 95 percent exceedance values:

(1) Wisconsin Electric shall not discharge water that exceeds the following maximum temperature water quality standard in degrees Fahrenheit (F):

January	38°F	July	83°F
February	38°F	August	81°F
March	41°F	September	74°F
April	56°F	October	64°F
May	70°F	November	49°F
June	80°F	December	39°F

(2) Wisconsin Electric shall not warm the Menominee River below the Project greater than 5 F above the existing water temperatures measured above the Project.

(3) Wisconsin Electric shall not cause the dissolved oxygen (DO) concentration, measured immediately downstream of the Project to be less than 5 mg/l.

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1 – The Wilderness Shores Implementation Team consists of representatives from Wisconsin Electric Power Company, Michigan Department of Natural Resources, Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, National Parks Service, River Alliance of Wisconsin, and the Michigan Hydro Relicensing Coalition.

In accordance with the requirements found in Article 423, water temperature and DO was monitored at two locations downstream of the project: within the new tailrace and at another location downstream of where the project's tailrace flow becomes riverine. In addition, monitoring was also conducted upstream of the facility near the powerhouse intake in conformance with the Water Quality Certification for the Twin Falls Project[2]. Upstream monitoring consisted of continuous monitoring along with vertical dissolved oxygen and temperature profiles near the powerhouse intake. A photo depicting the monitoring locations can be found in Figure 1.

Monitoring for DO and temperature was conducted from June 1 through September 30 with values recorded every hour using portable water quality monitoring equipment manufactured by YSI, Inc. The instrumentation was cleaned and calibrated according to manufacturer specification on a weekly basis[3] during the monitoring period. A post deployment calibration was conducted to determine the extent of calibration drift. Raw data was adjusted assuming a linear degradation of calibration based upon a post calibration of the equipment.

During the 2017 water quality monitoring season, no deviations from the DO or temperature water quality standards were observed at the upstream or downstream monitoring locations. Enclosed with this report are excel spreadsheets containing the monitoring data, in both tabular and graphical format. For your convenience, a comparison of the DO and temperature monitoring data from each of the monitoring locations is also enclosed.

A comparison of the DO monitoring data shows that DO concentrations were relatively consistent between the three monitoring locations. Monitoring data from the downstream monitoring locations shows a slight increase in DO was observed downstream of the facility, which is expected due to aeration of the discharge flow with distance from the powerhouse. The upstream monitoring data shows daily, and even hourly, fluctuations in DO concentrations. The DO fluctuations observed upstream of the facility are likely due to the monitor being located in the epilimnion of the reservoir (approximately 1 meter below the water surface) at a location which is slightly protected from the hydraulic influence of the powerhouse intake.

Temperature monitoring conducted showed that water temperature was not being affected by the operation of the facility. A comparison of the monthly average water temperature monitoring data can be found in Table 1:

Table 1: Monthly Average Temperature (°F), by monitoring location

	Upstream	Tailrace	Downstream
June	65.6	65.5	65.6
July	71.5	70.9	71.0
August	69.3	69.0	69.0
September	64.2	64.0	64.0

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2 – Water Quality Certification for the Twin Falls Project (FERC No. 11831). Filed August 27, 2013.

3 – Monitoring frequency prescribed in the Wilderness Shores Settlement Agreement, Paragraph 4.1.9.

A graphical comparison of the data does show some daily fluctuations in temperature between the upstream and downstream monitoring data, with periods of slightly higher temperatures observed upstream of the facility. The higher temperatures observed upstream of the facility are likely due to the monitor being located in the epilimnion of the reservoir (approximately 1 meter below the water surface), which is more susceptible to solar heating. The monitoring data confirmed that the facility operation is not warming the Menominee River below the Project greater than 5 F above the existing water temperatures measured above the Project.

As required by the project license, We Energies will be conducting a second year of monitoring in 2018. For the next monitoring season, We Energies proposes the following changes to the monitoring plan for the Twin Falls Hydroelectric Project:

1- To modify the frequency of equipment maintenance from weekly to once every two weeks during the monitoring period. The one week maintenance frequency identified in the WSSA was based on the use of older technologies where dissolved oxygen monitoring equipment was more susceptible to calibration drift. Current water quality monitoring equipment use optical technologies which mitigate DO calibration drift.
2- Discontinue continuous monitoring upstream of the project. Monitoring upstream and downstream of the project in 2017 did not reveal any DO or temperature issues. In lieu of continuous monitoring, We Energies will conduct a vertical dissolved oxygen and temperature profile near the powerhouse intake concurrent with maintenance activities for the continuous monitoring equipment located downstream of the powerhouse.

Please review the enclosed data and provide any comments you may have within 30 days of this letter. Should you have any questions or concerns, feel free to contact me at (920) 433-1833 or MWMetcalf@integrysgroup.com.

Sincerely,

Mark Metcalf

Mark Metcalf
Principal Environmental Consultant

Enclosure – 2017 water quality monitoring data.

Twin Falls Hydroelectric Project - 2017 Water Quality Monitoring Locations