

FEDERAL ENERGY REGULATORY COMMISSION
Washington, D. C. 20426

OFFICE OF ENERGY PROJECTS

Project No. 2785-015--Michigan
Sanford Project

Project No. 10808-005--Michigan
Edenville Project

Project No. 10809-004--Michigan
Secord Project

Project No. 10810-006--Michigan
Smallwood Project
Boyce Hydro Power, LLC.

June 3, 2015

Lee W. Mueller, Co-Member Manager
Boyce Hydro Power, LLC
10120 W. Flamingo Road, Suite 4192
Las Vegas, NV 89147

Subject: 2014 Water Quality Monitoring Report and Request to Amend Water Quality
Monitoring Plan

Dear Mr. Mueller:

This letter acknowledges receipt of your Water Quality Monitoring Report for 2014, filed concurrently with the Federal Energy Regulatory Commission (Commission), Michigan Department of Natural Resources (MDNR), and Michigan Department of Environmental Quality (MDEQ) on January 29, 2015. The report details the temperature and dissolved oxygen (DO) concentration data collected at the Sanford, Edenville, Smallwood, and Secord projects, located on the Tittabawassee River in Michigan, pursuant to Article 407 of the amended Sanford Project license (FERC No. 2785),¹ Article 402 of the Edenville (FERC No. 10808),² Smallwood (FERC No. 10810),³ and

¹ Order on Rehearing and Amending License Order. 61 FERC ¶ 61,066 (issued October 16, 1998).

² Order Issuing Original License. 85 FERC ¶ 61,063 (issued October 16, 1998).

Secord (FERC No. 10809)⁴ project licenses, and the approved Water Quality Monitoring Plan (plan)⁵ for all of the projects. In this letter we evaluate your compliance with your license requirements and your application to amend those requirements.

BACKGROUND AND REQUIREMENTS

The Water Quality Monitoring Plan requires you to annually monitor water temperature and DO concentration in the tailrace below each project. Both parameters are to be recorded on an hourly basis, and water temperature is monitored year-round while DO concentrations are monitored from June 1 through September 30 (monitoring period). The license of each project provides the standards for DO concentrations (instantaneous minimum of 5 mg/L) and monthly average maximum water temperatures for the Tittabawassee River, and states that you must implement all reasonable and prudent measures to ensure that the water quality standards are met whenever inflows to the projects are greater than or equal to the 95 percent exceedence inflow. If low DO concentrations occur below any of the projects, you are to measure DO just upstream of the influence of the project reservoir to determine the cause of the low DO concentration. Further, the plan describes the corrective measures to be taken if the DO concentration or water temperature standards are not met.

In 2013,⁶ you proposed to use improved methods and upgraded equipment to help you comply with the water quality requirements and to ensure the reliability and accuracy of the data. You installed the monitoring equipment in a way that would prevent sediment accumulation, conducted frequent quality assurance and quality control checks using handheld monitoring equipment, and downloaded data several times a week. Additionally, you proposed to discharge additional flows through the spill gates as the initial corrective action for any reported low DO concentrations, and to monitor water quality data to determine if the corrective action was effective. If the additional discharge did not correct the problem, you proposed other actions, such as pumping cooler waters from deeper levels in the reservoir or routing small flows through the turbines. You performed a spill test in 2013 at the Edenville and Secord projects. Finally, in order to obtain a more complete understanding of the water quality dynamics related to storage and discharge at your projects, you also proposed to collect DO and

³ Order Issuing Minor License. 85 FERC ¶ 61,065 (issued October 16, 1998).

⁴ Order Issuing Minor License. 85 FERC ¶ 61,064 (issued October 16, 1998).

⁵ Order Modifying and Approving Water Quality Monitoring Plans. 87 FERC ¶ 62,365 (issued June 29, 1999).

⁶ Letter filed with the Commission on May 20, 2013.

water temperature depth profiles in each of the project impoundments, and to obtain temperature data at locations upstream of the influence of the project reservoirs.

2014 WATER QUALITY RESULTS

You state that the maximum water temperature criteria were not exceeded during 2014 in the tailraces of any of the projects. However, the minimum DO concentration criterion was exceeded multiple times at each project during the monitoring period. You also report that minimum DO concentrations upstream of the turbine intakes during the lowest readings were all significantly below 5 mg/L. You did not report that you provided any spill or other corrective actions in 2014 in response to the low DO concentrations.

AMENDMENT REQUESTS

On January 30, 2015, you filed a request: (1) to reduce the frequency of water quality monitoring from annually to every five years; (2) to be temporarily excused from meeting the license requirements for DO concentrations; and (3) to be excused from connecting the DO monitoring equipment to the SCADA system at each project. You stated that since 2000, you have conducted five years of water quality data collection, and that in each year you have reported temperatures that meet the established criteria, but DO concentrations are often below 5 mg/L during the monitoring period.

The results of the first three years of monitoring were unreliable, largely due to problems with the equipment. You proposed improved monitoring methods in 2013, and you have conducted water quality monitoring in 2013 and 2014 under the updated methods. After two years of monitoring under these updated methods, you concluded that there are several factors influencing the low DO concentrations at the projects which you believe you neither cause nor can control. You state that low DO concentrations from the tributaries may be caused by high levels of nutrients in the impoundments. Further, watershed usage, dense shoreline development, failed septic systems, and weed abatement applications may influence DO concentrations in the project impoundments. You state that average and minimum nitrate concentrations in the Secord and Smallwood impoundments are significantly above what is normal for the region, and that DO concentrations in the upper impoundments are significantly low at defined locations.

You conclude that the last two years of monitoring suggest other contributing factors that fall under the jurisdiction of local government and the State of Michigan, and that until these factors are brought under control, you do not believe the projects can meet the 5 mg/L criterion for DO concentrations. Further, you state that because the current conditions prevent you from meeting the requirements, connecting the DO monitoring equipment to the SCADA system would be a misuse of time and resources. You state that until significant improvements are made around the impoundments, there is little

need to continue recording the same deficiencies every year. Therefore, you propose to reduce the frequency of monitoring to once every five years until significant improvements are seen in the results.

Agency Consultation

You filed the 2014 water quality report with the Commission, MDNR, and MDEQ on January 29, 2015, and filed the request to amend the water quality plan with the Commission, MDNR, and U.S. Fish and Wildlife Service (FWS) on January 30, 2015. MDNR provided comments on the report and amendment application in a letter dated February 26, 2015.

MDNR notes that there are only two years of acceptable data (2013 and 2014) from which to draw conclusions. While MDNR agrees that the data collected in 2013 and 2014 is an improvement, it states that the licenses for each project require you to mitigate for low DO concentrations in the tailraces of the projects, not the impoundments, and states that the upstream DO profiles in the summer are typical of eutrophic water bodies, as most lakes and reservoirs in Michigan will stratify in the summer and the volume of water below the thermocline will be anoxic. MDNR notes that the data shows the upper water column remained above the 5 mg/L criterion, and the bulk of water in the withdrawal zone had DO concentrations sufficient to meet criterion in the tailraces as long as water was passing through the projects.

MDNR further stated that the low DO concentrations in the tailraces are clearly associated with operations of the projects. The projects operate in peaking mode, and only the Sanford Project has defined minimum flow requirements. Specifically, when the upstream peaking units are shut down, the DO concentrations in the tailraces drop, and when the units are in operation, the DO concentrations improve, approaching or exceeding 5 mg/L. By examining a 15-day period (July 1-15, 2014), MDNR observed this trend in DO concentrations and found that the Smallwood, Secord, and Edenville were out of compliance for 86 percent, 36 percent, and 71 percent of that time period, respectively. In comparison, DO concentrations at the Sanford Project were stable and had minimal variation over the same 15-day period with no apparent deviations from the DO concentration criterion. MDNR stated that your 2013 test spills at the Secord Project showed that DO concentrations could be improved, and that operations at the Sanford Project have shown that maintaining flow can help protect DO concentrations. Based on the spill test at the Secord Project and the minimum flows required at the Sanford Project, MDNR concluded that you are able to mitigate for low DO concentrations in the tailraces at the projects by spilling water during periods when the units are offline, and that this is a reasonable method to meet the requirements of the respective license articles.

With regard to your request to reduce the monitoring frequency, MDNR stated that it normally requires a minimum of three years of data regarding a project's ability to

meet the minimum water quality standards before determining whether a reduction in the monitoring frequency is appropriate. MDNR stated that if a project cannot meet the standards after a three-year test period, then a more comprehensive evaluation would need to be performed in order to justify monitoring on a reduced frequency. Given the consistency of results between the 2013 and 2014 data and the extent of the low DO concentrations, MDNR stated that it is unlikely to agree to a reduced frequency of monitoring.

Response to Agency Comments

You responded to MDNR's comments in a letter dated March 17, 2015. You provided additional data to indicate that the DO concentrations at the Sanford Project are sometimes less than 5 mg/L as required, even with the minimum flow requirements at the Sanford Project. With regard to the upstream projects, you provided data that shows you would need to spill water almost every hour when the turbines are not running during the warm summer months in order to meet the 5 mg/L requirement.

You noted that at the Smallwood Project there were 59 days when the turbines were running but the DO concentrations remained less than 5 mg/L, and that similar events happened occasionally (less than five days) at the Secord and Edenville projects. You explained that, if spill were initiated whenever DO concentrations fell below 5 mg/L, you would have to open a gate each day when the turbine was shut down and leave it open until the next morning when the turbine was started again. You stated that it would be difficult to try to have a SCADA system alert the operator when it was time to open the gates, as it could happen multiple times during weeknights and weekends when the turbines are not running.

Further, you stated that in order to follow a procedure of constant flow when the turbines are not running, the first consideration would be to figure out how much water needs to be discharged in order to bring DO concentrations in the tailrace into compliance. You calculated that providing spill would translate to a revenue loss of \$109,200 for the four summer months. Additionally, the operational changes necessary would require overtime hours for personnel to operate the gates, making the total loss per year \$116,600.

Discussion

Your request to amend the license requirements has three parts: (1) to reduce the monitoring frequency to once every 5 years; (2) to remove the requirement to connect the water quality monitoring equipment to the respective SCADA systems; and (3) to be excused from the requirement to meet the water quality standards at all times.

Frequency of monitoring

You requested to reduce the frequency of monitoring to once every 5 years, as you find it futile to report the same DO deficiencies each year. As stated above, your Water Quality Monitoring Plan requires you to annually monitor water temperature and DO concentration in the tailrace below each project. The objective of the monitoring is to identify when project operations result in water quality deficiencies, determine when to implement corrective measures, and verify whether those corrective measures are effective.

Based on the most recent two years of data, we note that water quality deviations are most frequent and more extreme at the Secord and Smallwood projects. The table below describes the number of days when DO concentrations did not meet the criterion for the entire day (24 hours) in the tailrace of those two projects in 2013⁷ and 2014:

<u>Month</u>	<u>Number of Days Secord Tailrace DO was <5 mg/L</u>		<u>Number of Days Smallwood Tailrace DO was <5 mg/L</u>	
	<u>2013</u>	<u>2014</u>	<u>2013</u>	<u>2014</u>
June ⁸	1	2	5	6
July	13	6	24	19
August	6	6	13	10
September	2	2	6	2

In both 2013 and 2014, the Smallwood Project has the lowest monthly minimum, maximum, and average DO concentrations of all the projects (with one exception, a reading of 0.17 mg/L recorded in September 2013 at the Sanford Project). More concerning, in 2014 the Smallwood Project was out of compliance for 15 consecutive days from July 17 to August 1, with an average DO concentration during that period of 0.89 mg/L. You implemented no corrective actions at this time. During the entire month of July 2014, the Smallwood Project was only in compliance with the DO concentration criterion for a total of 61 hours. We further note that the Smallwood Project was out of compliance 100 percent of the time between 8:00 pm to 6:00 am in July 2014, and our analysis of the hourly data agrees with MDNR's findings that DO concentrations at the projects improve when the turbine units are in operation, and remain low over weekends and during weeknights when the units are shutdown.

⁷ The 2013 data for both projects was reported every four hours, not hourly.

⁸ Monitoring in June was not for the full 30 days, but for 14 days in June 2013 and 22 days in June 2014.

As noted above, your monitoring results indicate that there continues to be deviations of the DO criterion. Considering that low DO continues to be an issue downstream of your projects, we cannot justify authorization to discontinue monitoring. It is necessary to continue monitoring the water quality because you must be able to recognize and address any deviations from the water quality standards established in the project licenses. Water with low dissolved oxygen water can adversely affect aquatic resources and reduce the capacity of the river to assimilate waste. Because it is important to understand the severity and frequency of the DO concentration issues in the tailraces, the impact of project operations on water quality, and the potential for harm to aquatic resources due to poor water quality, we do not agree that you should be excused from recording water quality data at this time.

Furthermore, the test spills you conducted in 2013 have shown that you can mitigate for low DO concentrations in the tailraces at the projects by spilling water during periods when the units are offline. Continuous and annual monitoring during the low DO season (June 1 through September 30) allows you to immediately implement the mitigation measures required by the Water Quality Monitoring Plan. Therefore, you must continue to monitor DO concentration and water temperature in conformance with your approved Water Quality Monitoring Plan and report the data to the resource agencies and Commission.

Connecting the SCADA system

You requested to be temporarily excused from connecting the DO monitoring equipment to a SCADA system. However, the 1999 water quality monitoring plans filed for each project and approved by the Commission, state:

“DO will be monitored by a continuous DO monitor from June 1 to September 30 each year. The output of the DO monitor will be input into the project SCADA system to be recorded every hour. In addition the SCADA system will send an alarm to operations personnel at any time the DO input falls below 5 mg/l...A temperature sensor will be installed in the same location as the DO sensor and the output will also be fed into the SCADA system for recording on an hourly basis...If the DO monitoring system indicates a measurement of less than 5 mg/l the SCADA system will alarm the operating personnel. The operating personnel will respond to the project within 2 hours to take action to alleviate the water quality condition. The appropriate action to alleviate a low DO condition will be a release of water over the spillway which would aerate the water downstream of the [Sanford, Edenville, Smallwood, and Secord] project[s]. The aeration spill would continue until the conditions that caused the low DO readings have subsided.”

You state that because you are unable to meet the DO requirements under the current conditions, connecting to an alarm system would be a misuse of time and resources. In your March 17, 2015 filing, you emphasize the difficulty of connecting to a SCADA system to alert the operator when to open the gates when DO concentrations drop below criteria, as this could occur multiple times during weeknights and would pose an operational and economic problem. You have made previous arguments against connecting the water quality monitoring to a SCADA system. Specifically, in your May 20, 2013, letter to the Commission, you stated that improvements to the water quality monitoring program would assure that water quality criteria are met and necessary corrective actions would be taken swiftly, and therefore a connection to the SCADA system would not be necessary. In our July 16 and October 23, 2013 letters, we acknowledged the updated methods and agreed that installation of a SCADA system may be postponed while you gain experience with, and a better understanding of the water quality monitoring program. However, your water quality monitoring and mitigation program is not currently meeting the DO concentration criterion as assured. Therefore we conclude that the water quality equipment should now be connected to the SCADA system in order to alert project operators to low DO concentrations so that appropriate action is taken quickly to correct or alleviate the problem.

After review of the available information in your 2014 Water Quality Monitoring Report, we conclude that in order for you to initiate corrective actions in response to the frequent below-criterion DO concentrations at the projects, you must connect the water quality monitoring equipment to a SCADA system. The data is conclusive that there are multiple and extended periods when the 5 mg/L DO criterion is not met when the units are turned off, which may be corrected or alleviated by releasing water downstream. Connecting the DO monitoring equipment to the SCADA system would provide the mechanism to alert project operators remotely of low trending DO readings. Operators could assess how much water is being released and then take corrective action in a timely manner to enable you to comply with the water quality standards and requirements of your licenses.

We recognize the operational and economic concerns you have about connecting to a SCADA system given the frequency of low DO occurrences in the tailraces. However, without the connection we do not believe that you are immediately aware of deviations from the water quality standards, and therefore unable to enact corrective measures in a timely manner. You state that data is downloaded several times a week, but you do not state whether it is examined at that time to determine current conditions, or if data is downloaded and saved for future analysis. Your current methods do not allow for immediate recognition of a low-DO concentration issue and corrective action. The SCADA system, as a component of the Water Quality Monitoring Plan, would immediately inform you of when corrective actions are necessary and would contribute to your compliance with the water quality standards at the projects. We also understand that you attribute the low DO concentrations to factors beyond your control. However,

without connecting the monitoring equipment to the SCADA system and implementing the approved corrective actions, it cannot be concluded to what extent the hydro projects affect water quality and the utility the SCADA system has on improving water quality in the tailraces of the projects. Therefore, you must begin connecting the water quality monitoring equipment devices to the SCADA systems.

We recognize that connecting all four projects water quality monitoring equipment to the SCADA systems for this year's monitoring period would be difficult; nevertheless, implementation should proceed on a phased installation schedule. Please initiate the connection of the water quality equipment at the Smallwood Project, which has the most extensive water quality deviations of the four projects, to the project's SCADA system. Installation must be completed no later than August 31, 2015 in order to test the system during September 2015. Please file a report by September 30, 2015 indicating that the water quality monitoring equipment at the Smallwood Project has been successfully connected to the project's SCADA system. Please include a sample printout from the SCADA system showing water temperature and DO data. You are reminded that connecting the water quality monitoring equipment to the SCADA systems is part of the approved Water Quality Monitoring Plan under Article 407 of the Sanford license and Article 402 of the Edenville, Smallwood, and Secord licenses, therefore, the remaining three projects must be connected prior to the June 1, 2016 monitoring season.

Meeting the required 5 mg/L DO concentration

Lastly, you requested to be temporarily excused from meeting the required DO concentration of 5 mg/L. We agree that there may be multiple factors that impact the DO concentrations in the impoundments which could consequently have an impact on the water quality in the tailraces. However, as MDNR notes, and as required in the respective license articles and Water Quality Monitoring Plan, if DO concentrations are below 5 mg/L in the tailraces of your projects, you are responsible to spill water to increase the aeration.

At the time of licensing the Edenville, Smallwood, and Secord projects and amending the Sanford project license, Commission staff analyzed the effects of project operation on water quality and recognized in the Multiple Project Environmental Assessment (EA)⁹ that continued operation of the projects has the potential to occasionally violate state standards for DO concentrations, primarily during low-flow periods. Staff concluded that operational modifications (such as spilling) could be an effective measure to prevent such violations and would not be likely to cause violations of the temperature criteria. Commission staff further recognized the potential cumulative adverse effects of DO concentrations and temperature levels in the river based on the

⁹ The Multiple Project Environmental Assessment evaluated the impacts of all four projects on the environmental resources of the area and was issued August 14, 1998.

combined effects of biological oxygen demand (BOD) from municipal and septic discharge within the watershed, the potential loss of aeration due to reservoir stratification, and the lack of spillage at the project dams during low-flow peaking operations. Because maintenance of the state's DO standard downstream of each project dam would protect the water quality and aquatic resources of the Tittabawassee River, licensing of the Secord, Smallwood, and Edenville projects and the amendment of the Sanford Project license included enhancement measures to be implemented at each project to ensure compliance with the water quality standards.

We understand that you may not always be able to meet the water quality standards, but you have not demonstrated and documented that all mitigation measures have been tried and failed. To the contrary, the data indicates that spilling water when the units are offline is an effective mitigation measure. Further, your rationale of not knowing how much water to spill is not an appropriate reason to avoid mitigating altogether for low DO concentrations. Your brief spill tests, conducted at the Secord and Edenville projects in 2013, indicated that spills were able to increase DO concentrations in the tailraces. You concluded that spills of 450 and 235 cubic feet per second (cfs) significantly increased DO concentrations (up to 8 mg/L), and that a spill of 15 cfs maintained DO concentrations above 5 mg/L. You deemed the Edenville test spill to be inconclusive, because you could not correlate increased spill (15 cfs) to increased DO concentrations and because DO concentrations were already above 5 mg/L before and after the test spill. This is not necessarily an inconclusive finding but indicates that a study better timed to coincide with depressed DO concentrations would likely be more appropriate. Specifically, we note that DO concentrations during the test spill were maintained above 5 mg/L, whereas on the day prior to the spill test, DO concentrations were occasionally below 5 mg/L. You have not provided sufficient data or reasoning to suggest that attaining 5 mg/L DO is not achievable. The spill tests indicate that DO concentrations may be increased or maintained above 5 mg/L. Therefore, as required by Article 402 of the Edenville, Smallwood, and Secord project licenses and Article 407 of the amended Sanford Project license, you are required to maintain 5 mg/L DO concentrations below each dam, and you are required under your approved Water Quality Monitoring Plan for all four projects to implement the required corrective measures in response to low DO readings.

SUMMARY

Your requests to reduce the frequency of monitoring, delay the connection to a SCADA system, and be excused from the water quality requirements are denied. You are required to comply with your license articles and your approved Water Quality Monitoring Plan. Under the conditions of your licenses, it is your responsibility to conduct annual water quality monitoring and implement corrective actions. Failure to do so in the future will constitute a violation of the approved Water Quality Plan and will be taken into consideration during compliance reviews. We expect that your 2015

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monitoring program is currently underway and you are implementing corrective actions when DO is below 5 mg/L. As a reminder, your annual water quality report must be filed with the Commission by December 31, 2015.

Further, you must begin connecting the water temperature and DO concentration monitoring equipment at the Smallwood Project to the project's SCADA system, and complete the connection by August 31, 2015, with a report and sample printout filed with the Commission by September 30, 2015. The remaining three projects must have their water quality monitoring equipment connected to their respective SCADA systems no later than June 1, 2016.

This letter constitutes notice under section 31(a) of the Federal Power Act (FPA). Section 31 of the FPA affirms the Commission's authority to monitor and investigate compliance and, based on the Commission's findings, to assess civil penalties for violations of licenses under part I of the FPA. Your efforts to proceed with all due diligence will be considered in any future Commission action on this matter.

If you have any questions concerning this letter, please contact Ms. Holly Frank at (202) 502-6833.

Sincerely,

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