ATTACHMENT C – DOCUMENTATION OF CONSULTATION

Shawn Puzen

From:	Virgil E. Schlorke <VESchlorke@uppco.com>
Sent:	Tuesday, October 24, 2017 2:06 PM
To:	Oun, Amira (DEQ); Burr Fisher; Gulotty, Elle (DNR)
Cc:	Kenneth M. Carruthers; Joshua Ball; Katie Kern; Jim Grundstrom
Subject:	Dead River Hydroelectric Project No. 10855-Final Test Report
Attachments:	Attachment A.PDF; Attachment B.pdf; 20171024 DRP Test Year 4 Report Agency.pdf
Categories:	Filed by Newforma

Good Afternoon Amira, Elle, and Burr!

As a result of the Order Modifying and Approving the Article 405 Operations Monitoring Plan dated March 11, 2010, enclosed is the Final Test Report for your review and comment.

Please provide your comments within 30 days. If UPPCO does not receive comments within 30 days, it will assume you do not have any comments and will proceed with filing the report with the FERC.

We respectfully request, if you have concerns or questions with the information included in the report, you provide us with the opportunity to discuss them with you prior to you submitting your formal comments. Please contact me directly to arrange a time to discuss.

Thanks,
Virgil

Virgil E. Schlorke, P.E.
Director – Generation & Environmental Services
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Dead River Hydroelectric Project

Three Year Test Period – Test Year Four Final Annual Report (2016-2017)

Upper Peninsula Power Company

Test Year Four (2016-2017) Report Contents:

Attachments:

INTRODUCTION

Per the Article 405 "*Operations Monitoring Plan*" required by the License issued October 4, 2002, as amended January 24, 2006 and September 1, 2011, Upper Peninsula Power Company (UPPCO) is required to conduct a three-year test period on its Dead River Hydroelectric Developments. The test period is conducted to determine UPPCO's ability to comply with the provisions of Articles 402, and 403 of the License. Additionally, UPPCO shall provide copies of the annual report to the Federal Energy Regulatory Commission (FERC) within four (4) months of completion of a testing year[1].

In the Year Three Testing Report filed with the FERC on December 5, 2016, UPPCO proposed to conduct a fourth year of testing due to the unavailable storage in Silver Lake Storage Basin (SLSB) during the 2016 summer season. On January 31, 2017, the FERC approved the recommendation. Therefore, UPPCO is providing this report for the fourth year.

Prior to submittal of the report to FERC, UPPCO must provide copies to the Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), and the United States Fish and Wildlife Service (USFWS). The report must contain the following information:

- Hourly operations data for reservoir elevations and total plant flows at each development
- A description of any deviations from operational requirements
- A summary of any anomalies in operations
- A summary of the four (4) years of operations testing
- Recommendations to modify project operations to achieve compliance as necessary

HOURLY DATA FOR RESERVOIR HEADWATER ELEVATION AND TOTAL PLANT FLOWS

Hourly data for each testing year's operation of the Dead River Hydroelectric Project is provided as both a graphical representation, as well as given in tabular format provided in the attached table. The data is provided in terms of hourly headwater elevation data (ATTACHMENT A) and hourly total plant flow data (ATTACHMENT B). It should be noted that sharp" spikes" in the data typically portray a plant outage, which are reported as either

[1] "Testing Year" is the timeframe determined by the FERC upon UPPCO's fulfillment of the Silver Lake Storage Basin Refill Plan. This window has been declared as being annually August 5 to August 4 of the following year

individual planned or unplanned deviations (greater than 60 minutes), or they are provided in the annual deviations report (less than 60 minutes).

There are occurrences of missing data in the record. Each area of missing data has a note attached that indicates why the data is not presented. In most cases, data has been deliberately removed because it is obviously errant data where rapid changes in elevation are not physically possible. The errant data has been removed to provide for an accurate graphical display. However, during the period on or about February 14, 2017, data is missing because UPPCO was implementing its own independent operating system during this time-period and was separating itself from the operating system of its former parent company Integrys. Therefore, there were lapsed periods where data is not available.

Fulfillment of license requirements:

UPPCO filed its report titled "2016 Annual Report - Operation Monitoring & Report of Deviations Less Than Sixty Minutes" with FERC on February 28, 2017. The report outlines all deviations within the 2016 operating year, per Articles 402 and 403 of the License.

The 2016 operating year had three (3) deviations less than 60-minutes and five (5) deviations 60-minutes or greater. None of the deviations reported in the 2016 annual report were a result of UPPCO's inability to comply with requirements of the License. The figure below was provided as a table in the annual deviation report to FERC, and provides a summary of all deviations at each Development on the Dead River Project:

Figure 1. 2016 Dead River annual deviation summary

Deviations < 60 Minutes				
Project	Date	Length	Deviation	Reason
McClure	01/12/2016	14 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	11 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	16 Minutes	Minimum Flow	Unit trip due to continued packing adjustments

Deviations > 60 Minutes				
Project	Date	Length	Deviation	Reason

Hoist[2]	03/17/2016	1 Hr 11 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	03/17/2016	1 Hr 10 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	08/01/2016	16 days	Minimum Flow	Part 12 inspection and concrete repairs
Hoist	10/15/2016	1 Hr 43 Mins	Minimum Flow	Plant trip due to high winds
McClure	11/07/2016	1 Hr 50 Mins	Minimum Flow	Plant trip due to bearing cooling water line plug
Hoist	12/25/2016	2 Hr 7 Mins	Minimum Flow	Oil pump belt failure

UPPCO has observed and reported seven (7) deviations 60-minutes or greater within the 2017 operating year prior to August 5, 2017. Two of the deviations were planned

Deviations.
Five of the deviations were due to weather events. One of the planned deviations was conducted to allow UPPCO to meet the May start of month target elevation of 1341.0 feet NGVD at the Dead River Storage Basin (DRSB)[3]. Table 1 provides a summary of all deviations greater than 60 minutes in the 2017 operating year.

It should be noted, the SLSB was refilled and resumed normal operation on May 10, 2017.

Table 1. 2017 Summary of deviations greater than 60 minutes

Development	Date	Length	Deviation	Reason
Hoist	01/16/2017	14 days	Target Elevation	Hold Reservoir Constant for Ski Marathon
McClure	01/20/2017	1 Hr 30 Mins	Minimum Flow	Local weather storm caused plant electrical fault
Hoist	03/07/2017	1 Hr 12 Mins	Minimum Flow	Local weather storm caused plant electrical fault

[2] The Hoist Facility impounds the Dead River Storage Basin.
[3] The May start of month target of 1341.0 feet NGVD was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

Hoist	03/17/2017	21 days	Target Elevation	Planned deviation to achieve 1341.0 feet NGVD-May Start of Month Target
Hoist	04/10/2017	2 days and 12 Hrs	Minimum Flow	Local weather storm caused plant electrical fault
McClure	04/10/2017	> 1 day and < 1 day	Minimum Flow and Headwater	Local weather storm caused plant electrical fault
McClure	04/22/2017	19 days	Headwater	High Inflow due to weather

Deviations that are less than 60 minutes will be included in the 2017 annual report to be sent to the agencies for review and comment by the end of January.

MODIFICATIONS TO OPERATION THAT WERE IMPLEMENTED AS PART OF THE TEST PERIOD

UPPCO proposed several operational deviations in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 test reports. These were implemented to comply with the provisions of Articles 402, and 403 of the License. The provisions that were implemented and recommendations for future operations are listed by development as follows:

Silver Lake Storage Basin:

1. Adjustment of the start of month target elevation for May, June, and July at SLSB to the top of the spillway 1485.2 feet NAVD 88 or 1485.04 feet NGVD[4] was implemented. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 season.

Dead River Storage Basin:

1. A meeting in February or early March in 2014, 2015, 2016, and 2017 was arranged by UPPCO for consultation with the resource agencies (MDEQ, MDNR, and USFWS), and stakeholders (Dead River Campers Inc. (DRCI) and Keweenaw Bay Indian Community) to discuss UPPCO's suggestions to alter the DRSB operations prior to Spring runoff. This discussion included altering operations based on snowpack depth and water equivalency, as well as weather predictions.

2. An adjustment of the start of month target for the month of May was implemented in 2014, 2015, 2016, and 2017. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 or 1342.0 feet NGVD in 2014. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 feet NGVD in 2015 and 2017. In 2016, the target was modified to 1342.0 or 1343.0 feet NGVD because SLSB could not provide storage for the DRSB because it was in a drawn down state.

[4] The elevation of the top of the spillway was verified as 1485.20 feet NAVD-88 or 1485.04 feet NGVD during the 2017 dam safety inspection. Since the elevations are listed in the license in NGVD, an elevation of 1485.04 feet NGVD will be utilized.

3. UPPCO requested to eliminate the start of month target elevations for March and April for the 2017 season, but after consultation with the MDNR and MDEQ, it was believed to be premature and the request was withdrawn.

McClure Basin:

1. For the 2017 season, the maximum elevation of 1196.4 feet NGVD (spillway crest elevation) was eliminated.[5] This elevation proved difficult to attain when wave action or excess water due to storm events or runoff caused water to be spilled. In addition, Article 405 requires UPPCO to release flushing flows over the spillway. In 2017, UPPCO operated the McClure Storage Basin at or above 1194.8 feet NGVD, with no maximum reservoir elevation, while limiting fluctuations in elevation of not more than one (1) foot/day.

[5] Elimination of the maximum reservoir elevation at the McClure Basin was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

SUMMARY OF FOUR YEARS OF OPERATIONS TESTING

Silver Lake Storage Basin:

1. Start of month targets

- If Spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- During the recreation season, the operation of the SLSB is based upon the water input needs to the DRSB.
- The water needs of the DRSB during most years, require the SLSB to provide storage after spring runoff and during the recreation season.
- The need for start of month target elevations at the SLSB after spring runoff and during the recreation season has been overshadowed by the need to provide storage in SLSB for the DRSB to maintain the start of month targets for the DRSB.
- The compliance point for target elevations after spring runoff and during the recreation season has evolved to become the DRSB start of month target elevations.
- The target elevations after spring runoff and during the recreation season are unnecessary and sometimes burdensome target elevations when striving to meet DRSB start of month target elevations.
- The current start of month target elevations for the SLSB beginning at spring runoff and ending with the end of the summer recreation season will not allow for enough storage in the SLSB to maintain the start of month target elevations at the DRSB during the summer recreation season.
- It has been demonstrated through the test period, by adjusting the start of month target elevations at SLSB to 1485.04 (top of spillway) for June and July, it is beneficial to maintain the start of month elevations within the DRSB for the summer months by adjusting the start of month target elevations at SLSB to 1485.2 for June and July.
- It is difficult to determine the onset of spring runoff each year. In 2014, and 2015, spring runoff began in very early April[6]. In 2016[7] and 2017 spring runoff began in March.
- The April start of month target elevation influences operational decisions on flow releases in March (because striving to achieve a start of month target elevation is

[6] The 2014 and 2015 runoff is determined by viewing the graph contained in Year One and Year Two Test Reports.
[7] Since the elevation of Silver Lake Storage Basin in 2016 was held low, the start of runoff for the area has been determined by looking at the flows for the USGS gage on the Middle Branch of the Escanaba River at Humboldt (USGS Gage No. 04057800).

implemented in March) and consequently during the potential period when spring runoff can begin.

- In the summer of 2017, UPPCO was forced to release water from the SLSB to strive to meet the arbitrary August start of month target elevation of 1480.0 while the DRSB was above its target of 1341.0.
- The start of month target elevations at the SLSB for the months of April through October are unnecessary.
- The start of month target elevations for November through March provide a benefit to limit reservoir fluctuations during freezing conditions to minimize impact upon hibernating reptiles.
- The monthly minimum elevations provide a benefit by assuring SLSB is not unduly impacted by drawdowns to meet the start of month target elevations at the DRSB.
- There is a need to maintain minimum flow releases from the SLSB even if the start of month target elevations or the minimum elevations cannot be maintained.

Dead River Storage Basin:

1. Consultation

- Precipitation in the form of snow or rain (when it melts and how it melts) is a major driving factor in the operation of the Dead River System (primarily the SLSB and the DRSB).
- If proper decisions are not made in the winter prior to spring runoff, the start of month target elevations may not be met during the summer recreation season or the elevation of the DRSB can rise well above the target elevation during spring runoff.
- If spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- Consultation with all stakeholders in February or early March is necessary for all stakeholders to understand the difficulty of predicting how and when spring runoff will occur. This reduces criticism by stakeholders during the summer recreation season.

2. May start of month target

- Spring runoff during the test period has occurred prior to the second part of April.
- If the start of month target for May is not increased to 1341.0 feet NGVD, spring runoff cannot be stored in the DRSB to its maximum potential for the summer recreation season.

- With a May start of month target of 1340.0 feet NGVD, UPPCO would be forced to release water downstream to drive the elevation down to the arbitrary target of 1340.0 feet NGVD and the elevation would most-likely not recover during the remaining summer recreation season.
- UPPCO has never operated during the test period with an arbitrary start of month target elevation of 1340.0 feet NGVD.

3. March and April start of month targets and minimums

- If there is not enough room in the DRSB to capture spring runoff, the reservoir elevation will rise rapidly until the spillway elevation is reached because maximum releases are limited until the elevation reaches the spillway.
- The nominal minimum spillway elevation is at an elevation of 1344.6 feet NGVD or approximately 3.5 feet above the start of month target elevations for the summer recreation season.
- UPPCO must take all reasonable steps to lower the impoundment to the target elevation.
- Some shoreline owners have filed concerns with FERC about reservoir elevations exceeding 1341.0 feet NGVD.
- Lowering the reservoir elevation from 1344.6 feet NGVD to 1341.0 feet NGVD can take weeks.
- The March and April start of month target elevation of 1337.5 feet NGVD for the DRSB is too restrictive to achieve and maintain a reservoir elevation of 1341.0 feet NGVD during the summer recreation season.
- Through consultation with stakeholders, in 2014, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of 1335.8 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1344.7 feet NGVD.
- Through consultation with stakeholders, in 2015, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of approximately 1334.0 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1342.5 feet NGVD.

- In 2016, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were not deviated from because the SLSB was refilling from a drawdown for repairs the previous construction season. The DRSB was drawn down to a minimum elevation of 1337.9 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1343.2 feet NGVD.
- Through consultation with stakeholders, in 2017, fearing very little snowpack, and believing spring runoff would not occur in 2017, the start of month target elevation for April 1 was changed to 1339.0 feet NGVD. The reservoir rose to an elevation of approximately 1345.1 feet NGVD in early May.
- The start of month target elevations and the minimum elevation requirements for the DRSB for March and April of each year are driven by the need to meet the start of month target elevations for the summer recreation season.
- The start of month target elevations and the minimum elevation requirements for the DRSB for March and April of each year have become arbitrary.
- During late February and early March, the operation of the DRSB is already dictated only by the need to achieve the start of month target elevations during the summer recreation season and guided by snowpack information.
- UPPCO has committed to conduct a meeting with stakeholders in February or early March. This commitment also renders the March and April elevation requirements unnecessary.

McClure Basin:

1. Maximum reservoir elevation

- Exceeding the maximum reservoir elevation at the McClure Dam causes water to flow over the spillway that provides the periodic flushing flows required under Article 405.

ANOMALIES IN OPERATION

2013-2014 Test Period

Spring runoff in 2014 was higher than expected and occurred prior to UPPCO being able to fully draw down the DRSB as planned. UPPCO began drawing down the DRSB to an elevation of 1335.0 feet NGVD, but was only able to reach a minimum elevation of 1335.8 feet NGVD prior to the onset of spring runoff. This resulted in a maximum spring reservoir elevation at the DRSB of 1344.7 feet NGVD. The DRSB remained above 1341.0 feet NGVD until June 19, 2014.

Under the Consent Judgment for the Dead River Recovery Effort with the Michigan Department of Environmental Quality, UPPCO released approximately 150 cfs from the low-level outlet at the SLSB for approximately 72 hours (May 2 to May 5, 2014), resulting in a maximum elevation of approximately 1484.5 feet NGVD on the last day of May. This activity had some, but minimal impact upon the ability of UPPCO to achieve a start of month target elevation of 1485.04 feet NGVD for the month of June at the SLSB.

During the months of July and August, 2014, the Hoist powerhouse was out of service and unable to complete planned maintenance work on the turbine leads and thrust bearings. During the period the units were out of service, flows were passed through the low-level outlet at the Hoist Dam. Approximately 100 to 105 cfs was passed during this time frame. The theoretical maximum capacity of the low-level outlet at a DRSB elevation of 1341.0 feet NGVD is approximately 125 cfs. During this time-period, the DRSB elevation was at or near 1341.0 feet NGVD.

2014-2015 Test Period

During the Spring of 2015 UPPCO initiated a planned deviation and planned drawdown of the SLSB to reach an elevation of 1476.0 feet NGVD to complete work on the dam. Drawdown of the SLSB took place just after the peak-runoff period until the anticipated construction start date of July 15, 2015. The SLSB would not refill again until May 10, 2017.

UPPCO also initiated a planned deviation prior to the planned drawdown to reduce the intensity of flows needed to draw SLSB down in the necessary timeframe necessary to meet construction deadlines. The planned deviation suggested lowering the June start of month target elevation for the SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD, and lowering

the June monthly minimum elevation at SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD. UPPCO also suggested keeping the June start of month target elevation for the DRSB at 1342.0 feet NGVD, to allow for increased storage capacity during the upcoming summer months.

Due to an unexpected amount of heavy precipitation during the spring and early summer months, UPPCO was unable to fully reach the target elevation of 1479.0 feet NGVD at the SLSB as proposed in the planned deviation. UPPCO still initiated the drawdown of SLSB, and maintained compliance with the summer recreation elevation of 1341.0 feet NGVD by using the proposed 1342.0 feet NGVD at DRSB as a storage buffer. The maximum elevation reached in the DRSB for 2015 was 1342.9 feet NGVD on or about May 31, 2015.

2015-2016 Test Period

As stated previously, during the spring of 2015 UPPCO initiated a planned deviation and a planned drawdown of its SLSB to reach an elevation of 1476.0 feet NGVD. Drawdown of SLSB took place just after the peak-runoff period and occurred until the construction start date, July 15, 2015.

The data shows the effects of this drawdown in terms of both flows and elevations at SLSB for the remainder of 2015 and throughout 2016. In addition to limited reservoir elevations resulting from the drawdown, UPPCO was unable to release any flows above the required minimum monthly flows while it strived to refill the SLSB to 1485.04 feet NGVD per FERC Dam Safety requirements. Refill did not occur during the 2015-2016 Test Period.

Additionally, UPPCO had a period in 2015 where it entered dry year consultation with Stakeholders to attempt to meet license requirements. From late September to late December of 2015, UPPCO released reduced minimum flows. UPPCO returned the DRSB and the MB to normal operations on December 28, 2015 when the DRSB elevation was 1338.9 feet NGVD (December minimum elevation is 1338.5 feet NGVD and January start of month target is 1339.0 feet NGVD).

On March 22, 2016, UPPCO conducted a planned deviation at the DRSB, to avoid a potential inability to recover from the April start of month target elevation (1337.5 feet NGVD) and to maintain higher elevations at DRSB for the recreation season. UPPCO targeted elevation

1342.0 feet NGVD with proposed storage to 1343.0 feet NGVD. UPPCO continued this planned deviation until Labor Day. The maximum elevation reached at the DRSB during the planned deviation period in 2016 was approximately 1343.2 feet NGVD on April 29th.

The planned deviations resulting from the FERC Dam Safety Restrictions at the SLSB resulted in extending the three-year test period to the 2016-2017 season.

2016-2017 Test Period

On August 1, 2016, UPPCO conducted a planned deviation to curtail the required minimum flow release of 80 cfs from the MB for penstock inspection and concrete work and allow the MB elevation to exceed 1196.4 feet NGVD to pass water over the spillway and downstream. During that time-period, the maximum reservoir elevation for the MB was approximately 1196.6 feet NGVD on August 15, 2016. Normal operation resumed on August 16, 2016.

With the FERC Dam Safety restrictions at the SLSB, planned deviations were implemented during early 2017 to assure the DRSB could maintain its target elevation of 1341.0 feet NGVD during the summer recreation season. The following planned deviations were implemented:

- On March 6, 2017, at a DRSB elevation of approximately 1338.5 feet NGVD, UPPCO conducted a planned deviation to change the start of month target elevation for April from 1337.5 feet NGVD to 1338.5 feet NGVD. This was to preserve the water being stored, knowing the SLSB might not be available to provide additional storage for the DRSB during the summer recreation season.
- On Monday March 17, 2017, UPPCO modified the April start of month target elevation deviation from 1338.5 feet NGVD to 1339.0 feet NGVD. Normal operation of the DRSB resumed when the elevation rose above 1341.0 feet NGVD during early April. The maximum reservoir elevation for the DRSB of 1345.1 feet NGVD occurred in early May.

On May 10, 2017, the FERC Dam Safety restrictions were lifted for the SLSB and the it resumed normal operation.

RECOMMENDATIONS TO MODIFY PROJECT OPERATIONS TO ACHIEVE COMPLIANCE

Silver Lake Storage Basin:

In the simplest terms, the recommended changes below allow for UPPCO to fill the SLSB during spring runoff. Hold the water in the SLSB until it needs to be released to the DRSB to maintain the start of month target elevations during the summer recreation season. The changes will allow for the intended operation of the Dead River Hydroelectric Project without arbitrary restrictions that cannot adapt to the changing factors leading to spring runoff each year.

1. Operate the SLSB to refill and strive for an elevation of 1485.04 (the nominal elevation of the spillway) during spring runoff.
2. After Spring runoff, operate the SLSB above all the current minimum reservoir elevations while releasing flows above the required minimum flows and striving to meet start of month target elevations at the DRSB until October 1 of each year.
3. After October 1 of each year, operate the SLSB to strive to meet the start of month target elevations for November, December, January, February, and March.
4. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.
5. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.
6. At all times maintain the monthly minimum flows as required from the SLSB.

Dead River Storage Basin:

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated Spring runoff event.
2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.
3. Change the April and May minimum reservoir elevations for the DRSB to 1334.0 feet NGVD[8].

[8] 1344.0 feet NGVD was the lowest minimum elevation required during the test period (2015) prior to spring runoff.

4. Eliminate the start of month target elevations for March and April.

McClure Basin:

1. No changes are recommended.

PROPOSED AMENDMENTS TO LICENSE CONDITIONS

The proposed amendments are outlined by facility or development in the recommendations to modify project operations to achieve compliance section above.

RECOMMENDATIONS FOR INCREASED MONITORING

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

ATTACHMENT A- HOURLY HEADWATER ELEVATION DATA

ATTACHMENT B- HOURLY TOTAL PLANT FLOW DATA

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY (MDEQ) COMMENTS

January 3, 2018 MDEQ comments on UPPCO's October 24, 2017 Report

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

C. HEIDI GRETHER
DIRECTOR

January 3, 2018

VIA E-MAIL

Mr. Virgil Schlorke
Upper Peninsula Power Company
1002 Harbor Hills Drive
Marquette, Michigan 49855

Dear Mr. Schlorke:

SUBJECT: Dead River Hydroelectric Project – Silver Lake, Hoist, and McClure Developments
P-10855: Three-year test period - 2016-2017 Test Year Four Annual Report -
Comments by the Michigan Department of Environmental Quality (MDEQ)

Per Article 405, "Operations Monitoring Plan," required by the License issued October 4, 2002, as amended January 24, 2006, and September 1, 2011, the Upper Peninsula Power Company (UPPCO) is required to conduct a three-year test period on its Dead River Hydroelectric Developments to determine UPPCO's ability to comply with the provisions of Articles 402, and 403 of the License. UPPCO submitted their three-year test period - 2016-2017 Test Year Four Annual Report (report) on October 24, 2017, which include a summary of four years of operations testing and recommendations to modify project operations to achieve compliance.

On December 11, 2017, staff from the MDEQ and the Michigan Department of Natural Resources (MDNR) visited the three UPPCO developments (Silver Lake, Hoist, and McClure). The agencies participated in discussion with UPPCO. The MDEQ then reviewed UPPCO's report. Please see the comments below.

MDEQ comments on project operations:

As described in the Commission's March 11, 2010, Order Modifying and Approving Article 405 Operations Monitoring Plan, UPPCO states in its proposed plan that the three-year test period will consist of three "normal" water years. UPPCO defines a normal water year as a calendar year in which the average flow as measured at the United States Geological Survey Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10 percent of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The licensee proposes to begin the three-year test period when conditions for the Silver Lake Refill Plan are fulfilled. Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May 2017; this limits the MDEQ's ability to draw conclusions about the effects of the proposed changes.

The MDEQ does not recommend repeating the test period but cannot support all changes in the project operations that have been recommended by UPPCO because of the high number of deviations that occurred during the test period.

The MDEQ has commented on what has been recommended by UPPCO and given that, UPPCO has already agreed to drop a number of its recommended changes as a result of follow-up discussions with the MDNR and the MDEQ:

Silver Lake Storage Basin (SLSB):

1. Operate the SLSB to refill and strive for an elevation of 1485.04 (the nominal elevation of the spillway) during spring runoff.

Response:

Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

2. After spring runoff, operate the SLSB above all the current minimum reservoir elevations while releasing flows above the required minimum flows and striving to meet start of month target elevations at the DRSB until October 1 of each year.

Response:

Please see the response to Number 1 above. Operating the SLSB with no target elevations for 6 months will cause an environmental impact to the system. The test report did not provide enough information to support the changes.

3. After October 1 of each year, operate the SLSB to strive to meet the start of month target elevations for November, December, January, February, and March.

Response:

None.

4. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.

Response:

None.

5. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.

Response:

None.

6. At all times maintain the monthly minimum flows as required from the SLSB.

Response:

None.

Dead River Storage Basin (DRSB):

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated spring runoff event.

Response:

The MDEQ recommends that UPPCO to complete and update the hydrologic model for the Dead River to increase the ability of UPPCO to predict the spring runoff and other events.

2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

Response:

Changing the May start of month target elevation from 1340.0 feet to 1341.0 feet National Geodetic Vertical Datum (NGVD) is acceptable. The MDEQ agrees with this change.

3. Change the April and May minimum reservoir elevations for the DRSB to 1334.0 feet NGVD.

Response:

UPPCO dropped the change per our discussion on December 11, 2017.

4. Eliminate the start of month target elevations for March and April.

Response:

UPPCO dropped the change per our discussion on December 11, 2017.

McClure Basin:

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

Response:

None.

The MDEQ appreciates the opportunity to comment on the UPPCO October 2017 report. If you have any questions, please contact me at 517-284-5541; ouna@michigan.gov; or MDEQ, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958.

Sincerely,

Amira Oun, Environmental Engineer
Surface Water Assessment Section
Water Resources Division

cc: Mr. Kyle Kruger, MDNR
Mr. Gary Kohlhepp, MDEQ
Section 401 File

Response to MDEQ comments received January 3, 2018

MDEQ Comment (1), project operations:
As described in the Commission's March 11, 2010, Order Modifying and Approving Article 405 Operations Monitoring Plan, UPPCO states in its proposed plan that the three-year test period will consist of three "normal" water years. UPPCO defines a normal water year as a calendar year in which the average flow as measured at the United States Geological Survey Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10 percent of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The licensee proposes to begin the three-year test period when conditions for the Silver Lake Refill Plan are fulfilled. Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May 2017; this limits the MDEQ's ability to draw conclusions about the effects of the proposed changes.

The MDEQ does not recommend repeating the test period but cannot support all changes in the project operations that have been recommended by UPPCO because of the high number of deviations that occurred during the test period.

UPPCO Response (1), project operations:
The comment above correctly reflects UPPCO's proposed monitoring plan provided to the Commission on October 6, 2008 for approval.

However, the MDNR, in their September 4, 2008 comment letter, stated the following with emphasis added:

6.0 Three-Year Test Period

- Instead of the test period beginning January 1, 2010, or the year after Silver Lake refills to elevation 1481 feet, we recommend that the three-year test period commence at the same time as the Operations Monitoring Plan (i.e., after Silver Lake reaches the monthly target elevation, regardless of the month in which this occurs).
- Since the purpose of the test period is "to allow the applicant and the agencies to review potential compliance issues over a reasonable range of natural conditions" (see page 58 of the July 2002 Dead River Final Environmental Assessment), the test period should occur during the three consecutive years following Silver Lake reaching monthly target elevation, not merely years defined as "normal".

Test Period Conclusion

- A request to modify license conditions should only be submitted if warranted. Any request must also consider negotiated mitigation items included in the license and protection of natural resources in addition to UPPCO's ability to meet operating conditions.

If you have any questions about this matter, please contact me at 906-249-1611 ext 308 or mistakjl@michigan.gov. If you wish to contact me in writing, my address is:
Marquette Fisheries Station
Michigan Department of Natural Resources
484 Cherry Creek Rd
Marquette, MI 49855

Sincerely,

Jessica Mistak

Jessica Mistak, Senior Fisheries Biologist

The Commission, in their March 11, 2010 Order (Order), discussed the comment[1] and stated the following:

> **Three Year Test Period**
>
> 62. UPPCO states that the three year test period will consist of three "normal" water years defined as a calendar year in which the average flow as measured at the USGS Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10% of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The MDEQ recommended that the three year test period occur during three consecutive years in order to allow the licensee and the agencies "to review potential compliance issues over a reasonable range of natural conditions" (quoting the EA prepared for licensing).
>
> 63. Commission staff concurs with MDEQ. The EA refers to testing operations during a reasonable range of natural conditions and recognizes that there may be compliance difficulties related to maintaining reservoir water levels and minimum flows at the project developments, especially in dry years. Therefore, it is important to include such years in the evaluation. Moreover, should any party determine the need for the test period to be extended, recommendations and discussion could occur toward the end of the three year test period as part of the report that the licensee proposes to prepare.

Through the Commission's analysis and the comments of the MDNR, the Commission ordered in Paragraph (G) of the Order that "The licensee shall conduct operations testing for three consecutive years and file with the Commission, annual operations testing reports within 4 months of completing a test year."

Although changes in operation due to work at the SLSB was not anticipated in UPPCO's original proposal to use "normal" years for the test period, the MDNR insistence on "three consecutive years" served the basis for the current requirement in paragraph (G) of the Order. UPPCO can understand the need for "normal" years to evaluate impacts, but drawdowns and restricted operation at a facility during any given year is a normal part of the "reasonable range of natural conditions" (quoting the EA prepared for licensing) that can be experienced in the future.

The need to provide storage of spring runoff in SLSB each year was demonstrated to stakeholders with the drawdown of SLSB which began in the spring of 2015. In addition, restricted operation at SLSB from spring of 2015 to spring of 2017, also demonstrated how the SLSB and the DRSB are not independent of each other. If one storage basin is restricted (SLSB), the other basin is also impacted and changes in operation may be necessary in the second storage basin.

During the fall of 2015 until December 28, 2015, UPPCO initiated the dry-year consultation process because minimum elevations could not be maintained at the DRSB lacking the ability for UPPCO to draw water from SLSB under its state of drawdown.[2]

During the spring of 2016, UPPCO initiated a planned deviation period for the DRSB target elevations, recognizing SLSB would not be available to provide stored water to the DRSB in the summer recreation period under its state of drawdown.[3] UPPCO requested to target an elevation

---

[1] The Order references the comment arising from the MDEQ. However, under the review of the record by UPPCO, it cannot find a reference to the comment being provided by the MDEQ. It can only find a reference to the MDNR making the comment on September 4, 2008.

[2] See Planned deviation reports to FERC dated September 23, 2015 and January 14, 2016 (Submittals 20150923-5049 and 20160114-5246 respectively).

[3] See Planned deviation reports to FERC dated March 25, 2016 and October 5, 2016 (Submittals 20160325-5072 and 20161005-5128 respectively).

of 1342.0 feet NGVD with storage up to 1343.0 feet NGVD at the DRSB during spring runoff. This resulted in a minimum reservoir elevation during the summer recreation season of approximately 1340.0 feet NGVD during late August of 2016.

Even though the 2015-2016 test period showed the importance of storing water in SLSB for achieving and maintaining recreation reservoir elevations (1341.0 feet NGVD) at the DRSB, the test period was extended for one additional year and that fourth year of testing was conducted.

The MDEQ comment about the high number of deviations during the test period underestimates and minimizes the importance of the operational lessons learned during the test period of 2015-2016. An additional year of testing is not required and there has been adequate time to draw conclusions about the impact of the proposed operations.

MDEQ Comment (2), Silver Lake Storage Basin (SLSB):
1. Operate the SLSB to refill and strive for an elevation of 1485.04 (the nominal elevation of the spillway) during spring runoff.

Response:

Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO Response (2), *Silver Lake Storage Basin (SLSB)*:
Per a telephone conversation with the MDEQ on January 3, 2018, UPPCO emailed to the MDEQ, MDNR, and FWS a revised recommendation to better address MDEQ concerns. The email was provided for their comment on January 3, 2018.

Per additional telephone conversations with MDEQ on January 4, 2018, UPPCO provided a revised report incorporating the changes recommended in the January 3, 2018 email via email to the MDEQ, MDNR, and FWS for comment on January 4, 2018.

This comment is responded to in its entirety on the revised report recommendations in UPPCO Response 15.

MDEQ Comment (3), Silver Lake Storage Basin (SLSB):
2. After spring runoff, operate the SLSB above all the current minimum reservoir elevations while releasing flows above the required minimum flows and striving to meet start of month target elevations at the DRSB until October 1 of each year.

Response:

Please see the response to Number 1 above. Operating the SLSB with no target elevations for 6 months will cause an environmental impact to the system. The test report did not provide enough information to support the changes.

UPPCO Response (3), Silver Lake Storage Basin (SLSB):

See UPPCO Response (2), Silver Lake Storage Basin (SLSB).

MDEQ Comment (4), Silver Lake Storage Basin (SLSB):
3. After October 1 of each year, operate the SLSB to strive to meet the start of month target elevations for November, December, January, February, and March.

Response:

None.

UPPCO Response (4), Silver Lake Storage Basin (SLSB):
None.

MDEQ Comment (5), Silver Lake Storage Basin (SLSB):
4. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.

Response:

None.

UPPCO Response (5), Silver Lake Storage Basin (SLSB):
None.

MDEQ Comment (6), Silver Lake Storage Basin (SLSB):
5. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.

Response:

None.

UPPCO Response (6), Silver Lake Storage Basin (SLSB):
None.

MDEQ Comment (7), Silver Lake Storage Basin (SLSB):
6. At all times maintain the monthly minimum flows as required from the SLSB.

Response:

None.

UPPCO Response (7), Silver Lake Storage Basin (SLSB):
None.

MDEQ Comment (8), Dead River Storage Basin (DRSB):
1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated spring runoff event.

Response:

The MDEQ recommends that UPPCO to complete and update the hydrologic model for the Dead River to increase the ability of UPPCO to predict the spring runoff and other events.

UPPCO Response (8), Dead River Storage Basin (DRSB):
The model was completed in 2009 and was last updated in 2016. It will be updated as UPPCO deems necessary and may be used to make internal operational decisions.

MDEQ Comment (9), Dead River Storage Basin (DRSB):
2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

Response:

Changing the May start of month target elevation from 1340.0 feet to 1341.0 feet National Geodetic Vertical Datum (NGVD) is acceptable. The MDEQ agrees with this change.

UPPCO Response (9), Dead River Storage Basin (DRSB):
Comment noted.

MDEQ Comment (10), Dead River Storage Basin (DRSB):
3. Change the April and May minimum reservoir elevations for the DRSB to 1334.0 feet NGVD.

Response:

UPPCO dropped the change per our discussion on December 11, 2017.

UPPCO Response (10), Dead River Storage Basin (DRSB):
The report has been amended accordingly.

MDEQ Comment (11), Dead River Storage Basin (DRSB):
4. Eliminate the start of month target elevations for March and April.

Response:

UPPCO dropped the change per our discussion on December 11, 2017.

UPPCO Response (11), Dead River Storage Basin (DRSB):
The report has been amended accordingly.

MDEQ Comment (12), McClure Basin:

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

Response:

None.

UPPCO Response (12), McClure Basin:
None.

UPPCO's January 3, 2018 revised recommendation based upon a January 3, 2018 telephone conversation with MDEQ

Shawn Puzen

From: Shawn Puzen
Sent: Wednesday, January 03, 2018 10:42 AM
To: Oun, Amira (DEQ)
Cc: Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; 'Kruger, Kyle (DNR)'; Kohlhepp, Gary (DEQ); 'burr_fisher@fws.gov'; 'Gulotty, Elle (DNR)'
Subject: Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.

Categories: Filed by Newforma

Good Morning Amira,

In looking through the comments you provided to UPPCO on the three year test period, UPPCO has a recommendation it would like to provide before it responds to your comments.

Under Silver Lake Storage Basin Comment 1, you stated the following:

> Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO appreciates MDEQ taking the time to understand the need to store water at Silver Lake following spring runoff and understands the MDEQ need to name target elevations. UPPCO did not include start of month target elevations for the period following spring runoff through September 1 because the weather experienced during spring runoff and the summer months drives the storage needs at Silver Lake.

However, UPPCO will amend the three-year test period report to include start of month target elevations for May, June, and July of 1485.2 feet NAVD or 1485.04 feet NGVD. UPPCO agrees with the MDEQ and believes those target elevations will assist in operating the Dead River System as originally intended.

Under the MDEQ proposal, the target elevation for July 1 is 1485.04 feet NGVD and the target elevation for August 1 is 1480 feet NGVD. This would require UPPCO to strive to lower the Silver Lake Storage basin (releasing the majority of the stored water) starting July 2 approximately 5 feet to meet the start of month target elevation of 1480 feet NGVD by August 1.

In looking at the information on basin inflows provided by the Commission in the August 5, 2002 Final Environmental Assessment, Page 41 state the following:

Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station, USGS gaging station 04043800, located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[7] There are a few months of USGS data from the early

---

[7] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited. The penstock was repaired by February 1998 and the stream restoration efforts were successful.

On or about October 22, 1990, there was a failure of a clay tile drainage pipe

Although the record is slight regarding annual average inflows into the Dead River Storage Basin, they are indicative of what UPPCO has experienced with average inflows dropping to near or less (considering evaporation) than the required 100 cfs minimum flow release from the Dead River Storage Basin for August and September.

That being said, under the current MDEQ proposal, most of the stored water would be required to be released in July, when stored water will be needed to augment flows into the Dead River Storage Basin during August and September also (depending upon weather).

Therefore, UPPCO proposes to set the Start of Month Targets as follows in the test period report to allow for Silver Lake Storage Basin to still provide storage and augment flows into the Dead River Storage Basin in August and September:
(the recommended changes from the MDEQ proposal are marked in red)

May	**1485.04 feet NGVD**
June	**1485.04 feet NGVD**
July	**1485.04 feet NGVD**
August	**1483.2 feet NGVD**
September	**1481.4 feet NGVD**
October	**1479.5 feet NGVD**

This will allow UPPCO to utilize approximately 1.8 feet of storage during the month of July, August, and September. If the weather at the time dictates otherwise, UPPCO will have to consult for a planned deviation.

Please provide me your comments on this most-recent proposal.

Thank you.

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
Mead & Hunt | 1345B North Road | Green Bay, WI 54313
Direct: 920-593-6865 | Mobile: 920-639-2480
shawn.puzen@meadhunt.com | meadhunt.com

UPPCO's January 4, 2018 revised report based upon a January 4, 2018 telephone conversation with MDEQ

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, January 04, 2018 12:13 PM
To:	Oun, Amira (DEQ); 'Gulotty, Elle (DNR)'; 'burr_fisher@fws.gov'
Cc:	Katie Kern; Schlorke, Virgil E; Kenneth M. Carruthers; Kohlhepp, Gary (DEQ); 'Kruger, Kyle (DNR)'; 'jimgrundstrom@freichevy.com'
Subject:	Revised three-year test period final report for your comment-comments due EOB January 10, 2018.
Attachments:	01042018_Test Year 4 Report_Agency_Draft Number 2.pdf
Categories:	Filed by Newforma

Hi Amira, Elle, and Burr-

Per my telephone conversations with Amira and the email received from Elle yesterday, UPPCO has provided a revised report for your review and comment.

To keep the revised report manageable, the Appendices have not changed from the previous version and are not provided in this version.

There are several changes that have been made in the report.

They are as follows:
Removal of the term "arbitrary" (in response to MDNR comment on December 21, 2017).
Removal of the proposal to change the DRSB minimum elevations and start of month targets for April and May and the justification for it(per our discussions on December 11, 2017).
Propose new SLSB target elevations for May, June, July, August, and September and operate according to the target elevations listed in Article 402 for the remaining months and modify the justification for it.

The new SLSB target elevations are being proposed for May, June, and July in response to the MDEQ comment letter dated January 3, 2018 and the justification for proposing new SLSB target elevations for August and September were provided in the email from me to all of you dated January 3, 2018. To keep this request brief, those justifications are not repeated here.

UPPCO is under a deadline after already requesting one extension of time to file the final report by January 12, 2018. Therefore, please provide your comments by EOB January 10, 2018.

To ease your review, the additions to the plan have been high-lighted in yellow.

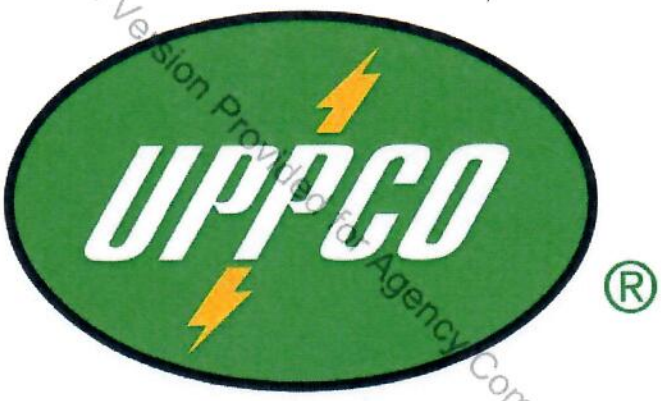
Thanks,

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
Mead & Hunt | 1345B North Road | Green Bay, WI 54313
Direct: 920-593-6865 | Mobile: 920-639-2480
shawn.puzen@meadhunt.com | meadhunt.com
https://www.linkedin.com/in/shawnpuzen

UPPCO's January 4, 2018 revised report

Dead River Hydroelectric Project

Three Year Test Period – Test Year Four Final Annual Report (2016-2017)



Upper Peninsula Power Company

Test Year Four (2016-2017) Report Contents:

Attachments:

INTRODUCTION

Per the Article 405 "*Operations Monitoring Plan*" required by the License issued October 4, 2002, as amended January 24, 2006 and September 1, 2011, Upper Peninsula Power Company (UPPCO) is required to conduct a three-year test period on its Dead River Hydroelectric Developments. The test period is conducted to determine UPPCO's ability to comply with the provisions of Articles 402, and 403 of the License. Additionally, UPPCO shall provide copies of the annual report to the Federal Energy Regulatory Commission (FERC) within four (4) months of completion of a testing year[1].

In the Year Three Testing Report filed with the FERC on December 5, 2016, UPPCO proposed to conduct a fourth year of testing due to the unavailable storage in Silver Lake Storage Basin (SLSB) during the 2016 summer season. On January 31, 2017, the FERC approved the recommendation. Therefore, UPPCO is providing this report for the fourth year.

Prior to submittal of the report to FERC, UPPCO must provide copies to the Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), and the United States Fish and Wildlife Service (USFWS). The report must contain the following information:

- Hourly operations data for reservoir elevations and total plant flows at each development
- A description of any deviations from operational requirements
- A summary of any anomalies in operations
- A summary of the four (4) years of operations testing
- Recommendations to modify project operations to achieve compliance as necessary

HOURLY DATA FOR RESERVOIR HEADWATER ELEVATION AND TOTAL PLANT FLOWS

Hourly data for each testing year's operation of the Dead River Hydroelectric Project is provided as both a graphical representation, as well as given in tabular format provided in the attached table. The data is provided in terms of hourly headwater elevation data (ATTACHMENT A) and hourly total plant flow data (ATTACHMENT B). It should be noted that sharp" spikes" in the data typically portray a plant outage, which are reported as either

[1] "Testing Year" is the timeframe determined by the FERC upon UPPCO's fulfillment of the Silver Lake Storage Basin Refill Plan. This window has been declared as being annually August 5 to August 4 of the following year

individual planned or unplanned deviations (greater than 60 minutes), or they are provided in the annual deviations report (less than 60 minutes).

There are occurrences of missing data in the record. Each area of missing data has a note attached that indicates why the data is not presented. In most cases, data has been deliberately removed because it is obviously errant data where rapid changes in elevation are not physically possible. The errant data has been removed to provide for an accurate graphical display. However, during the period on or about February 14, 2017, data is missing because UPPCO was implementing its own independent operating system during this time-period and was separating itself from the operating system of its former parent company Integrys. Therefore, there were lapsed periods where data is not available.

Fulfillment of license requirements:

UPPCO filed its report titled "2016 Annual Report – Operation Monitoring & Report of Deviations Less Than Sixty Minutes" with FERC on February 28, 2017. The report outlines all deviations within the 2016 operating year, per Articles 402 and 403 of the License.

The 2016 operating year had three (3) deviations less than 60-minutes and five (5) deviations 60-minutes or greater. None of the deviations reported in the 2016 annual report were a result of UPPCO's inability to comply with requirements of the License. The figure below was provided as a table in the annual deviation report to FERC, and provides a summary of all deviations at each Development on the Dead River Project:

Figure 1. 2016 Dead River annual deviation summary

Deviations < 60 Minutes				
Project	Date	Length	Deviation	Reason
McClure	01/12/2016	14 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	11 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	16 Minutes	Minimum Flow	Unit trip due to continued packing adjustments

Deviations > 60 Minutes				
Project	Date	Length	Deviation	Reason

Hoist[2]	03/17/2016	1 Hr 11 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	03/17/2016	1 Hr 10 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	08/01/2016	16 days	Minimum Flow	Part 12 inspection and concrete repairs
Hoist	10/15/2016	1 Hr 43 Mins	Minimum Flow	Plant trip due to high winds
McClure	11/07/2016	1 Hr 50 Mins	Minimum Flow	Plant trip due to bearing cooling water line plug
Hoist	12/25/2016	2 Hr 7 Mins	Minimum Flow	Oil pump belt failure

UPPCO has observed and reported seven (7) deviations 60-minutes or greater within the 2017 operating year prior to August 5, 2017. Two of the deviations were planned

Deviations.
Five of the deviations were due to weather events. One of the planned deviations was conducted to allow UPPCO to meet the May start of month target elevation of 1341.0 feet NGVD at the Dead River Storage Basin (DRSB)[3]. Table 1 provides a summary of all deviations greater than 60 minutes in the 2017 operating year.

It should be noted, the SLSB was refilled and resumed normal operation on May 10, 2017.

Table 1. 2017 Summary of deviations greater than 60 minutes

Development	Date	Length	Deviation	Reason
Hoist	01/16/2017	14 days	Target Elevation	Hold Reservoir Constant for Ski Marathon
McClure	01/20/2017	1 Hr 30 Mins	Minimum Flow	Local weather storm caused plant electrical fault
Hoist	03/07/2017	1 Hr 12 Mins	Minimum Flow	Local weather storm caused plant electrical fault

[2] The Hoist Facility impounds the Dead River Storage Basin.
[3] The May start of month target of 1341.0 feet NGVD was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

Hoist	03/17/2017	21 days	Target Elevation	Planned deviation to achieve 1341.0 feet NGVD-May Start of Month Target
Hoist	04/10/2017	2 days and 12 Hrs	Minimum Flow	Local weather storm caused plant electrical fault
McClure	04/10/2017	> 1 day and < 1 day	Minimum Flow and Headwater	Local weather storm caused plant electrical fault
McClure	04/22/2017	19 days	Headwater	High Inflow due to weather

Deviations that are less than 60 minutes will be included in the 2017 annual report to be sent to the agencies for review and comment by the end of January.

MODIFICATIONS TO OPERATION THAT WERE IMPLEMENTED AS PART OF THE TEST PERIOD

UPPCO proposed several operational deviations in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 test reports. These were implemented to comply with the provisions of Articles 402, and 403 of the License. The provisions that were implemented and recommendations for future operations are listed by development as follows:

Silver Lake Storage Basin:

1. Adjustment of the start of month target elevation for May, June, and July at SLSB to the top of the spillway 1485.2 feet NAVD 88 or 1485.04 feet NGVD[4] was implemented. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 season.

Dead River Storage Basin:

1. A meeting in February or early March in 2014, 2015, 2016, and 2017 was arranged by UPPCO for consultation with the resource agencies (MDEQ, MDNR, and USFWS), and stakeholders (Dead River Campers Inc. (DRCI) and Keweenaw Bay Indian Community) to discuss UPPCO's suggestions to alter the DRSB operations prior to Spring runoff. This discussion included altering operations based on snowpack depth and water equivalency, as well as weather predictions.

2. An adjustment of the start of month target for the month of May was implemented in 2014, 2015, 2016, and 2017. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 or 1342.0 feet NGVD in 2014. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 feet NGVD in 2015 and 2017. In 2016, the target was modified to 1342.0 or 1343.0 feet NGVD because SLSB could not provide storage for the DRSB because it was in a drawn down state.

[4] The elevation of the top of the spillway was verified as 1485.20 feet NAVD-88 or 1485.04 feet NGVD during the 2017 dam safety inspection. Since the elevations are listed in the license in NGVD, an elevation of 1485.04 feet NGVD will be utilized.

3. UPPCO requested to eliminate the start of month target elevations for March and April for the 2017 season, but after consultation with the MDNR and MDEQ, it was believed to be premature and the request was withdrawn.

McClure Basin:

1. For the 2017 season, the maximum elevation of 1196.4 feet NGVD (spillway crest elevation) was eliminated.[5] This elevation proved difficult to attain when wave action or excess water due to storm events or runoff caused water to be spilled. In addition, Article 405 requires UPPCO to release flushing flows over the spillway. In 2017, UPPCO operated the McClure Storage Basin at or above 1194.8 feet NGVD, with no maximum reservoir elevation, while limiting fluctuations in elevation of not more than one (1) foot/day.

[5] Elimination of the maximum reservoir elevation at the McClure Basin was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

SUMMARY OF FOUR YEARS OF OPERATIONS TESTING

Silver Lake Storage Basin:

1. Start of month targets

- If Spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- During the recreation season, the operation of the SLSB is based upon the water input needs to the DRSB.
- The water needs of the DRSB during most years, require the SLSB to provide storage after spring runoff and during the recreation season.
- The current start of month target elevations for the SLSB beginning at spring runoff and ending with the end of the summer recreation season will not allow for enough storage in the SLSB to maintain the start of month target elevations at the DRSB during the summer recreation season.
- It has been demonstrated through the test period, by adjusting the start of month target elevations at SLSB to 1485.04 feet NGVD (top of spillway) for June and July, it is beneficial to maintain the start of month elevations within the DRSB for the summer months by adjusting the start of month target elevations at SLSB to 1485.04 feet NGVD for June and July.
- It is difficult to determine the onset of spring runoff each year. In 2014, and 2015, spring runoff began in very early April[6]. In 2016[7] and 2017 spring runoff began in March.
- The April start of month target elevation influences operational decisions on flow releases in March (because striving to achieve a start of month target elevation is implemented in March) and consequently during the potential period when spring runoff can begin.
- In the summer of 2017, UPPCO was forced to release water from the SLSB to strive to meet the August start of month target elevation of 1480.0 while the DRSB was above its target of 1341.0.
- The start of month target elevations at the SLSB for the months of May through September need to be modified.

[6] The 2014 and 2015 runoff is determined by viewing the graph contained in Year One and Year Two Test Reports.
[7] Since the elevation of Silver Lake Storage Basin in 2016 was held low, the start of runoff for the area has been determined by looking at the flows for the USGS gage on the Middle Branch of the Escanaba River at Humboldt (USGS Gage No. 04057800).

- The start of month target elevations for November through March provide a benefit to limit reservoir fluctuations during freezing conditions to minimize impact upon hibernating reptiles.
- The monthly minimum elevations provide a benefit by assuring SLSB is not unduly impacted by drawdowns to meet the start of month target elevations at the DRSB.
- There is a need to maintain minimum flow releases from the SLSB even if the start of month target elevations or the minimum elevations cannot be maintained.
- The storage of colder water in the SLSB for release throughout the summer is believed to benefit water quality downstream during the early and late summer months.

Dead River Storage Basin:

1. Consultation

- Precipitation in the form of snow or rain (when it melts and how it melts) is a major driving factor in the operation of the Dead River System (primarily the SLSB and the DRSB).
- If proper decisions are not made in the winter prior to spring runoff, the start of month target elevations may not be met during the summer recreation season or the elevation of the DRSB can rise well above the target elevation during spring runoff.
- If spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- Consultation with all stakeholders in February or early March is necessary for all stakeholders to understand the difficulty of predicting how and when spring runoff will occur. This reduces criticism by stakeholders during the summer recreation season.

2. May start of month target

- Spring runoff during the test period has occurred prior to the second part of April.
- If the start of month target for May is not increased to 1341.0 feet NGVD, spring runoff cannot be stored in the DRSB to its maximum potential for the summer recreation season.
- With a May start of month target of 1340.0 feet NGVD, UPPCO would be forced to release water downstream to drive the elevation down to the target of 1340.0 feet NGVD and the elevation would most-likely not recover during the remaining summer recreation season.

- UPPCO has never operated during the test period with an start of month target elevation of 1340.0 feet NGVD.

3. March and April start of month targets and minimums

- If there is not enough room in the DRSB to capture spring runoff, the reservoir elevation will rise rapidly until the spillway elevation is reached because maximum releases are limited until the elevation reaches the spillway.
- The nominal minimum spillway elevation is at an elevation of 1344.6 feet NGVD or approximately 3.5 feet above the start of month target elevations for the summer recreation season.
- UPPCO must take all reasonable steps to lower the impoundment to the target elevation.
- Some shoreline owners have filed concerns with FERC about reservoir elevations exceeding 1341.0 feet NGVD.
- Lowering the reservoir elevation from 1344.6 feet NGVD to 1341.0 feet NGVD can take weeks.
- Through consultation with stakeholders, in 2014, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of 1335.8 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1344.7 feet NGVD.
- Through consultation with stakeholders, in 2015, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of approximately 1334.0 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1342.5 feet NGVD.
- In 2016, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were not deviated from because the SLSB was refilling from a drawdown for repairs the previous construction season. The DRSB was drawn down to a minimum elevation of 1337.9 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1343.2 feet NGVD.
- Through consultation with stakeholders, in 2017, fearing very little snowpack, and believing spring runoff would not occur in 2017, the start of month target elevation

for April 1 was changed to 1339.0 feet NGVD. The reservoir rose to an elevation of approximately 1345.1 feet NGVD in early May.

- The start of month target elevations and the minimum elevation requirements for the DRSB for March and April of each year are driven by the need to meet the start of month target elevations for the summer recreation season.
- During late February and early March, the operation of the DRSB is already dictated only by the need to achieve the start of month target elevations during the summer recreation season and guided by snowpack information.
- UPPCO has committed to conduct a meeting with stakeholders in February or early March. This commitment also renders the March and April elevation requirements unnecessary.

McClure Basin:

1. Maximum reservoir elevation

- Exceeding the maximum reservoir elevation at the McClure Dam causes water to flow over the spillway.

ANOMALIES IN OPERATION

2013-2014 Test Period

Spring runoff in 2014 was higher than expected and occurred prior to UPPCO being able to fully draw down the DRSB as planned. UPPCO began drawing down the DRSB to an elevation of 1335.0 feet NGVD, but was only able to reach a minimum elevation of 1335.8 feet NGVD prior to the onset of spring runoff. This resulted in a maximum spring reservoir elevation at the DRSB of 1344.7 feet NGVD. The DRSB remained above 1341.0 feet NGVD until June 19, 2014.

Under the Consent Judgment for the Dead River Recovery Effort with the Michigan Department of Environmental Quality, UPPCO released approximately 150 cfs from the low-level outlet at the SLSB for approximately 72 hours (May 2 to May 5, 2014), resulting in a maximum elevation of approximately 1484.5 feet NGVD on the last day of May. This activity had some, but minimal impact upon the ability of UPPCO to achieve a start of month target elevation of 1485.04 feet NGVD for the month of June at the SLSB.

During the months of July and August, 2014, the Hoist powerhouse was out of service and unable to complete planned maintenance work on the turbine leads and thrust bearings. During the period the units were out of service, flows were passed through the low-level outlet at the Hoist Dam. Approximately 100 to 105 cfs was passed during this time frame. The theoretical maximum capacity of the low-level outlet at a DRSB elevation of 1341.0 feet NGVD is approximately 125 cfs. During this time-period, the DRSB elevation was at or near 1341.0 feet NGVD.

2014-2015 Test Period

During the Spring of 2015 UPPCO initiated a planned deviation and planned drawdown of the SLSB to reach an elevation of 1476.0 feet NGVD to complete work on the dam. Drawdown of the SLSB took place just after the peak-runoff period until the anticipated construction start date of July 15, 2015. The SLSB would not refill again until May 10, 2017.

UPPCO also initiated a planned deviation prior to the planned drawdown to reduce the intensity of flows needed to draw SLSB down in the necessary timeframe necessary to meet construction deadlines. The planned deviation suggested lowering the June start of month target elevation for the SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD, and lowering

the June monthly minimum elevation at SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD. UPPCO also suggested keeping the June start of month target elevation for the DRSB at 1342.0 feet NGVD, to allow for increased storage capacity during the upcoming summer months.

Due to an unexpected amount of heavy precipitation during the spring and early summer months, UPPCO was unable to fully reach the target elevation of 1479.0 feet NGVD at the SLSB as proposed in the planned deviation. UPPCO still initiated the drawdown of SLSB, and maintained compliance with the summer recreation elevation of 1341.0 feet NGVD by using the proposed 1342.0 feet NGVD at DRSB as a storage buffer. The maximum elevation reached in the DRSB for 2015 was 1342.9 feet NGVD on or about May 31, 2015.

2015-2016 Test Period

As stated previously, during the spring of 2015 UPPCO initiated a planned deviation and a planned drawdown of its SLSB to reach an elevation of 1476.0 feet NGVD. Drawdown of SLSB took place just after the peak-runoff period and occurred until the construction start date, July 15, 2015.

The data shows the effects of this drawdown in terms of both flows and elevations at SLSB for the remainder of 2015 and throughout 2016. In addition to limited reservoir elevations resulting from the drawdown, UPPCO was unable to release any flows above the required minimum monthly flows while it strived to refill the SLSB to 1485.04 feet NGVD per FERC Dam Safety requirements. Refill did not occur during the 2015-2016 Test Period.

Additionally, UPPCO had a period in 2015 where it entered dry year consultation with Stakeholders to attempt to meet license requirements. From late September to late December of 2015, UPPCO released reduced minimum flows. UPPCO returned the DRSB and the MB to normal operations on December 28, 2015 when the DRSB elevation was 1338.9 feet NGVD (December minimum elevation is 1338.5 feet NGVD and January start of month target is 1339.0 feet NGVD).

On March 22, 2016, UPPCO conducted a planned deviation at the DRSB, to avoid a potential inability to recover from the April start of month target elevation (1337.5 feet NGVD) and to maintain higher elevations at DRSB for the recreation season. UPPCO targeted elevation

1342.0 feet NGVD with proposed storage to 1343.0 feet NGVD. UPPCO continued this planned deviation until Labor Day. The maximum elevation reached at the DRSB during the planned deviation period in 2016 was approximately 1343.2 feet NGVD on April 29th.

The planned deviations resulting from the FERC Dam Safety Restrictions at the SLSB resulted in extending the three-year test period to the 2016-2017 season.

2016-2017 Test Period

On August 1, 2016, UPPCO conducted a planned deviation to curtail the required minimum flow release of 80 cfs from the MB for penstock inspection and concrete work and allow the MB elevation to exceed 1196.4 feet NGVD to pass water over the spillway and downstream. During that time-period, the maximum reservoir elevation for the MB was approximately 1196.6 feet NGVD on August 15, 2016. Normal operation resumed on August 16, 2016.

With the FERC Dam Safety restrictions at the SLSB, planned deviations were implemented during early 2017 to assure the DRSB could maintain its target elevation of 1341.0 feet NGVD during the summer recreation season. The following planned deviations were implemented:

- On March 6, 2017, at a DRSB elevation of approximately 1338.5 feet NGVD, UPPCO conducted a planned deviation to change the start of month target elevation for April from 1337.5 feet NGVD to 1338.5 feet NGVD. This was to preserve the water being stored, knowing the SLSB might not be available to provide additional storage for the DRSB during the summer recreation season.
- On Monday March 17, 2017, UPPCO modified the April start of month target elevation deviation from 1338.5 feet NGVD to 1339.0 feet NGVD. Normal operation of the DRSB resumed when the elevation rose above 1341.0 feet NGVD during early April. The maximum reservoir elevation for the DRSB of 1345.1 feet NGVD occurred in early May.

On May 10, 2017, the FERC Dam Safety restrictions were lifted for the SLSB and the it resumed normal operation.

RECOMMENDATIONS TO MODIFY PROJECT OPERATIONS TO ACHIEVE COMPLIANCE

Silver Lake Storage Basin:

In the simplest terms, the recommended changes below allow for UPPCO to fill the SLSB during spring runoff. Hold the water in the SLSB until it needs to be released to the DRSB to maintain the start of month target elevations and support water quality during the summer recreation season. The changes will allow for the intended operation of the Dead River Hydroelectric Project without restrictions that cannot adapt to the changing factors leading to spring runoff each year.

1. Modify the start of month targets as follows:
    a. May-1485.02 feet NGVD
    b. June-1485.02 feet NGVD
    c. July 1485.02 feet NGVD
    d. August 1483.2 feet NGVD
    e. September 1481.4 feet NGVD
2. Maintain target elevations for the remaining months as currently listed under Article 402 of the license.
3. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.
4. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.
5. At all times maintain the monthly minimum flows as required from the SLSB.

Dead River Storage Basin:

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated Spring runoff event.
2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

McClure Basin:

1. No changes are recommended.

PROPOSED AMENDMENTS TO LICENSE CONDITIONS

The proposed amendments are outlined by facility or development in the recommendations to modify project operations to achieve compliance section above.

RECOMMENDATIONS FOR INCREASED MONITORING

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

ATTACHMENT A- HOURLY HEADWATER ELEVATION DATA

ATTACHMENT B- HOURLY TOTAL PLANT FLOW DATA

January 5, 2018 MDEQ comments on UPPCO's January 4, 2018 revised report

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

C. HEIDI GRETHER
DIRECTOR

January 5, 2018

VIA E-MAIL

Mr. Virgil Schlorke
Upper Peninsula Power Company
1002 Harbor Hills Drive
Marquette, Michigan 49855

Dear Mr. Schlorke:

SUBJECT: Dead River Hydroelectric Project – Silver Lake, Hoist, and McClure Developments
P-10855: Three-year test period - 2016-2017 Test Year Four Annual Report -
Comments by the Michigan Department of Environmental Quality (MDEQ)

Per Article 405, "Operations Monitoring Plan," required by the License issued October 4, 2002, as amended January 24, 2006, and September 1, 2011, the Upper Peninsula Power Company (UPPCO) is required to conduct a three-year test period on its Dead River Hydroelectric Developments to determine UPPCO's ability to comply with the provisions of Articles 402 and 403 of the License. UPPCO submitted its - 2016-2017 Test Year Four Annual Report (report) on October 24, 2017, which include a summary of four years of operations testing and recommendations to modify project operations to achieve compliance.

On December 11, 2017, staff from the MDEQ and the Michigan Department of Natural Resources (MDNR) visited the three UPPCO developments (Silver Lake, Hoist, and McClure), and discussed the operations with UPPCO. The MDEQ's comments on the report are below.

Project Operations

As described in the Commission's March 11, 2010, Order Modifying and Approving Article 405 Operations Monitoring Plan, UPPCO states in its proposed plan that the three-year test period will consist of three "normal" water years. UPPCO defines a normal water year as a calendar year in which the average flow as measured at the United States Geological Survey Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10 percent of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The licensee proposes to begin the three-year test period when conditions for the Silver Lake Refill Plan are fulfilled. Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May 2017; this limits the MDEQ's ability to draw conclusions about the effects of the proposed changes.

The MDEQ does not recommend repeating the test period but cannot support all changes in the project operations that have been recommended by UPPCO because of the high number of deviations that occurred during the test period.

The MDEQ has commented on UPPCO's recommendation and UPPCO has agreed to drop a number of its recommended changes as a result of follow-up discussions with the MDNR and the MDEQ:

Silver Lake Storage Basin (SLSB)

UPPCO's Recommendations

1. Operate the SLSB to refill and strive for an elevation of 1485.04 (the nominal elevation of the spillway) during spring runoff.

MDEQ Response:

Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88 for the period following spring runoff (May, June, and July)), this recommendation needs to be studied by MDEQ after the three year test period is approved by FERC. Then, UPPCO can request a change to the target elevations for May, June, July, August and September. UPPCO has proposed eliminating all start of the month targets without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, however, the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

2. After spring runoff, operate the SLSB above all the current minimum reservoir elevations while releasing flows above the required minimum flows and striving to meet start of month target elevations at the Dead River Storage Basin (DRSB) until October 1 of each year.

MDEQ Response:

Please see the response to Number 1 above. Operating the SLSB with no target elevations for 6 months might cause an environmental impact to the shoreline, UPPCO should propose a gradate drawdown to lower the lake elevation from 1485.04 feet 1479.5 feet (October start of the Month Target). The test report did not provide enough information to support the changes.

3. After October 1 of each year, operate the SLSB to strive to meet the start of month target elevations for November, December, January, February, and March.

MDEQ Response:

MDEQ agrees with UPPCO's recommendation

4. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.

MDEQ Response:

MDEQ agrees with UPPCO's recommendation. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.

MDEQ Response:

MDEQ agrees with UPPCO's recommendation

5. At all times maintain the monthly minimum flows as required from the SLSB.

MDEQ Response:

MDEQ agrees with UPPCO's recommendation

Dead River Storage Basin (DRSB):

UPPCO's Recommendations

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline its plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated spring runoff event.

MDEQ Response:

The MDEQ recommends that UPPCO complete and update the hydrologic model for the Dead River to increase the ability of UPPCO to predict the spring runoff and other events.

2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

MDEQ Response:

Changing the May start of month target elevation from 1340.0 feet to 1341.0 feet National Geodetic Vertical Datum (NGVD) is acceptable. The MDEQ agrees with this change.

McClure Basin:

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

MDEQ Response:

MDEQ agree with UPPCO's recommendation

The MDEQ appreciates the opportunity to comment on UPPCO's 2017 report. If you have any questions, please contact me at 517-284-5541; ouna@michigan.gov; or MDEQ, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958.

Sincerely,

Amira Oun, Environmental Engineer
Surface Water Assessment Section
Water Resources Division

cc: Ms. Elle Gulotty, MDNR
Mr. Gary Kohlhepp, MDEQ
Section 401 File

UPPCO responses to January 5, 2018 MDEQ comments on UPPCO's January 4, 2018 revised report

UPPCO has numbered the January 5, 2018 MDEQ comments consecutively for purposes of generating responses.

MDEQ Comment (13):
As described in the Commission's March 11, 2010, Order Modifying and Approving Article 405 Operations Monitoring Plan, UPPCO states in its proposed plan that the three-year test period will consist of three "normal" water years. UPPCO defines a normal water year as a calendar year in which the average flow as measured at the United States Geological Survey Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10 percent of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The licensee proposes to begin the three-year test period when conditions for the Silver Lake Refill Plan are fulfilled. Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May 2017; this limits the MDEQ's ability to draw conclusions about the effects of the proposed changes.

The MDEQ does not recommend repeating the test period but cannot support all changes in the project operations that have been recommended by UPPCO because of the high number of deviations that occurred during the test period.

UPPCO Response (13):
See UPPCO Response (1), project operations.

MDEQ Comment (14):
The MDEQ has commented on UPPCO's recommendation and UPPCO has agreed to drop a number of its recommended changes as a result of follow-up discussions with the MDNR and the MDEQ:

UPPCO Response (14):
This comment was likely inadvertently included in MDEQ's latest comments and is a comment on the initial report sent on October 24, 2017.

The January 4, 2018 revised report was amended accordingly to drop those recommendations.

MDEQ Comment (15)
Silver Lake Storage Basin (SLSB):

1. Operate the SLSB to refill and strive for an elevation of 1485.04 (the nominal elevation of the spillway) during spring runoff.

Response:

Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88 for the period following spring runoff (May, June, and July)), this recommendation needs to be studied by MDEQ after the three year test period is approved by FERC. Then, UPPCO can request a change to the target elevations for May, June, July, August and September. UPPCO has proposed eliminating all start of the month targets without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was

implemented in the 2015-2016 and 2016-2017 seasons, however, the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO Response (15):
Per a telephone conversation with the MDEQ on January 3, 2018, UPPCO emailed to the MDEQ, MDNR, and FWS a revised recommendation to better address MDEQ concerns. The email was provided for their comment on January 3, 2018.

Per additional telephone conversations with MDEQ on January 4, 2018, UPPCO provided a revised report via email to the MDEQ, MDNR, and FWS for comment on January 4, 2018. On January 5, 2018, the MDEQ responded to the revised report with comments. MDEQ comment (15) is in response to the change in recommendation included in the January 5, 2018 revised report.

Since the start of the test period (August 5, 2013), UPPCO has been attempting to operate SLSB to store water after spring runoff (except for the required maintenance drawdown period). This operation is consistent with the overall recommendations contained in the revised report provided on January 4, 2018.

Due to the changes to operation requirements, UPPCO monitored for erosion on the DRSB in the spring of 2013, in August of 2015, and during the spring of 2016. In addition, UPPCO is required to monitor for erosion every five years on the shoreline of both the SLSB and DRSB and address erosion as required by Article 401. To date, UPPCO has not identified any project induced erosion.

Regarding impacts to aquatic resources under the test period, the storage of cooler water upstream in the SLSB during the early summer and release during mid to late summer will cool the waters downstream.

Regarding other adverse aquatic impacts experienced during the test period, UPPCO is not aware of any impacts occurring, has not received any complaints of such adverse impacts during the test period, and has not received any information from the MDNR stating such impacts have occurred.

During the test period, the following significant SLSB reservoir elevation changes were made from before spring runoff to after spring runoff:

Year	Approximate SLSB Reservoir Elevation (feet NGVD)		Elevation Change (feet)
	Prior to Spring Runoff	*After Spring Runoff*	
2014	1476.0	1484.6	8.6
2015	1477.6	1482.5	4.9
2016[4]	1477.0	1481.1	4.1
2017	1482.3	1485.2	2.9

UPPCO notes the MDEQ comment that UPPCO's recommendations need to be studied by MDEQ after the three year test period is approved by FERC.

MDEQ Comment (16):
2. After spring runoff, operate the SLSB above all the current minimum reservoir elevations while releasing flows above the required minimum flows and striving to meet start of month target elevations at the DRSB until October 1 of each year.

[4] The SLSB was refilling during this period from the required 2015 maintenance drawdown.

Response:

Please see the response to Number 1 above. Operating the SLSB with no target elevations for 6 months might cause an environmental impact to the shoreline, UPPCO should propose a gradate drawdown to lower the lake elevation from 1485.04 feet
1479.5 feet (October start of the Month Target). The test report did not provide enough information to support the changes.

UPPCO Response (16):
This comment was likely inadvertently included in MDEQ's latest comments and is a comment on the initial report sent on October 24, 2017.

A telephone conversation with MDEQ on January 3, 2018, based upon their January 3, 2018 comments resulted in UPPCO developing a revised report which was submitted to the agencies on January 5, 2018.

The revised report included target elevations for all months. MDEQ did not comment on the recommend target elevations included in the revised report.

UPPCO made recommendations in the revised report for all months, including August and September. The August and September recommendations include a gradated transition from 1485.04 feet NGVD to the October start of month target elevation of 1479.5 feet NGVD to reduce adverse shoreline impacts. The information in support of the changes was provided to the agencies in its email dated January 3, 2018 and in the January 4, 2018 email that submitted the revised report for comments.

The information is re-stated below:

Shawn Puzen

From:	Shawn Puzen
Sent:	Wednesday, January 03, 2018 10:42 AM
To:	Oun, Amira (DEQ)
Cc:	Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; 'Kruger, Kyle (DNR)'; Kohlhepp, Gary (DEQ); 'burr_fisher@fws.gov'; 'Gulotty, Elle (DNR)'
Subject:	Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.
Categories:	Filed by Newforma

Good Morning Amira,

In looking through the comments you provided to UPPCO on the three year test period, UPPCO has a recommendation it would like to provide before it responds to your comments.

Under Silver Lake Storage Basin Comment 1, you stated the following:

> Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO appreciates MDEQ taking the time to understand the need to store water at Silver Lake following spring runoff and understands the MDEQ need to name target elevations. UPPCO did not include start of month target elevations for the period following spring runoff through September 1 because the weather experienced during spring runoff and the summer months drives the storage needs at Silver Lake.

However, UPPCO will amend the three-year test period report to include start of month target elevations for May, June, and July of 1485.2 feet NAVD or 1485.04 feet NGVD. UPPCO agrees with the MDEQ and believes those target elevations will assist in operating the Dead River System as originally intended.

Under the MDEQ proposal, the target elevation for July 1 is 1485.04 feet NGVD and the target elevation for August 1 is 1480 feet NGVD. This would require UPPCO to strive to lower the Silver Lake Storage basin (releasing the majority of the stored water) starting July 2 approximately 5 feet to meet the start of month target elevation of 1480 feet NGVD by August 1.

In looking at the information on basin inflows provided by the Commission in the August 5, 2002 Final Environmental Assessment, Page 41 state the following:

Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station, USGS gaging station 04043800, located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[7] There are a few months of USGS data from the early

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[7] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited. The penstock was repaired by February 1998 and the stream restoration efforts were successful.

On or about October 22, 1990, there was a failure of a clay tile drainage pipe

Although the record is slight regarding annual average inflows into the Dead River Storage Basin, they are indicative of what UPPCO has experienced with average inflows dropping to near or less (considering evaporation) than the required 100 cfs minimum flow release from the Dead River Storage Basin for August and September.

That being said, under the current MDEQ proposal, most of the stored water would be required to be released in July, when stored water will be needed to augment flows into the Dead River Storage Basin during August and September also (depending upon weather).

Therefore, UPPCO proposes to set the Start of Month Targets as follows in the test period report to allow for Silver Lake Storage Basin to still provide storage and augment flows into the Dead River Storage Basin in August and September:
(the recommended changes from the MDEQ proposal are marked in red)

May	**1485.04 feet NGVD**
June	**1485.04 feet NGVD**
July	**1485.04 feet NGVD**
August	**1483.2 feet NGVD**
September	**1481.4 feet NGVD**
October	**1479.5 feet NGVD**

This will allow UPPCO to utilize approximately 1.8 feet of storage during the month of July, August, and September. If the weather at the time dictates otherwise, UPPCO will have to consult for a planned deviation.

Please provide me your comments on this most-recent proposal.

Thank you.

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
Mead & Hunt | 1345B North Road | Green Bay, WI 54313
Direct: 920-593-6865 | Mobile: 920-639-2480
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MDEQ Comment (17):
3. After October 1 of each year, operate the SLSB to strive to meet the start of month target elevations for November, December, January, February, and March.

Response:

MDEQ agrees with UPPCO's recommendation

UPPCO Response (17):
Comment noted.

MDEQ Comment (18):
4. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.

Response:

MDEQ agrees with UPPCO's recommendation. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.

UPPCO Response (18):
Comment noted.

MDEQ Comment (19):
5. At all times maintain the monthly minimum flows as required from the SLSB.

Response:

MDEQ agrees with UPPCO's recommendation

UPPCO Response (19):
Comment noted.

MDEQ Comment (20), *Dead River Storage Basin (DRSB):*

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated spring runoff event.

Response:

The MDEQ recommends that UPPCO to complete and update the hydrologic model for the Dead River to increase the ability of UPPCO to predict the spring runoff and other events.

UPPCO Response (20):
See UPPCO Response (8), Dead River Storage Basin (DRSB):

MDEQ Comment (21):
2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

Response:

Changing the May start of month target elevation from 1340.0 feet to 1341.0 feet National Geodetic Vertical Datum (NGVD) is acceptable. The MDEQ agrees with this change.

UPPCO Response (21):
Comment noted.

MDEQ Comment (22):
McClure Basin:

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

Response:

MDEQ agrees with UPPCO's recommendation.

UPPCO Response (22):
Comment noted.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES (MDNR) COMMENTS

December 21, 2017 MDNR comments on UPPCO's October 24, 2017 Report

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

KEITH CREAGH
DIRECTOR

December 21, 2017

Mr. Virgil Schlorke
Upper Peninsula Power Company
1002 Harbor Hills Drive
Marquette, MI 49855

RE: DEAD RIVER HYDROELECTRIC PROJECT – SILVER LAKE, HOIST, AND MCCLURE DEVELOPMENTS P-10855: THREE YEAR TEST PERIOD- 2016-2017 TEST YEAR FOUR ANNUAL REPORT

Dear Mr. Schlorke,

The Michigan Department of Natural Resources (MDNR) has reviewed Upper Peninsula Power Company's (UPPCO) 2016-2017 Test Year Four Annual Report and summary for the Three Year Test Period at the Dead River Hydroelectric Project. As requested in your October 24th email, agency staff have made efforts to discuss concerns prior to development of formal comments. As part of that, UPPCO has participated in discussions with MDNR and Michigan Department of Environmental Quality (MDEQ) and hosted visits to developments on December 11, 2017. The purpose of this letter is to provide comments on the report and UPPCO's recommendations. We will focus on recommendations that we believe are being retained, and briefly noting those which have been dropped following discussions. There are a number of other topics which MDNR feels need to be handled separately, and anticipates requiring more time to resolve. We appreciate the opportunity to review and comment on the Report.

Background on the Three Year Test Period:

As described in the Commission's March 11, 2010 Order Modifying and Approving Article 405 Operations Monitoring Plan, the purpose of the Three Year Test Period was:

> "(8)...to determine the licensee's ability to comply with the storage basin water levels required by Article 402 and minimum flows required by Article 403, to begin after flow monitoring is implemented;"

UPPCO in its proposed plan characterized the Test Period as consisting of three "normal" water years. If a Test Period year does not meet this definition, UPPCO stated that the test year must be repeated, and that the Test Period would begin when conditions for the Silver Lake Refill Plan are fulfilled. While the refill plan may have been considered met when the Test Period began, Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May of 2017, reducing MDNR's ability to draw conclusions about the effects of future operations based on the Test Period.

In its response to the 2016 Three Year Test Period Report, MDNR noted that the conditions during Test Periods was highly variable (We are not aware of UPPCO documenting whether any of the test report years constituted a "normal" water year per the Operations Monitoring Plan or 2010 Commission Order), and that the system was still adjusting (referring both to the refill of Silver Lake, and the ecological conditions in the rebuilt channel and downstream post-2003.) The examples of deviations documented by UPPCO further complicated our review. Thus, MDNR requested an extension, in part, expecting that providing an additional year of data

and time to formulate its response would allow UPPCO to "develop an analysis in support of its future proposed target elevations." This expectation has not been fully met. As of the 2016 report, UPPCO proposed eliminating targets for Hoist in March and April. At the time it was unclear what operations would look like under various environmental conditions (including water availability) without those targets. It still is unclear what UPPCO's operation would look like; this recommendation was retained in UPPCO's 2017 Report, but subsequently dropped in follow-up conversations.

In the intervening time, UPPCO has provided a summary of conditions under which it sought planned deviations or did not meet targets as required, but has not provided a narrative detailing how its proposed changes to the license would affect aquatic resources or flows through the system, or detailed how elevations would be managed absent targets. Instead UPPCO describes license conditions as "arbitrary restrictions." While MDNR understands there are times when precipitation or other events outside UPPCO's control could make meeting target elevations or other parameters of the license difficult or impossible, the existence of those license parameters is important and necessary outside of those anomalous events; where the primary drivers of flow conditions, elevations and environmental impacts are a result of decisions of UPPCO in operating its facilities. In the license Environmental Assessment, the Commission considered whether to concur with the water quality certification (WQC) developed by MDEQ. The Commission weighed the benefits of reduced reservoir level fluctuations for fisheries, shoreline vegetation, and recreation along with the UPPCO's ability to maintain minimum flows, and generate power. It is MDNR's conclusion that based on prior determinations by the Commission with consideration of both agency comments and UPPCO's concerns, the parameters of the WQC and the license are not arbitrary.

In the case of Hoist, if targets were eliminated for March and April, it seems likely that the meeting with agencies and stakeholders would be when UPPCO shares its proposed plan for reservoir elevation management. Consultation (either prior to spring runoff, or for 'dry years') has been haphazard in the recent past. Poor predictive ability of UPPCO regarding spring runoff and other events are going to be problematic in the absence of standard procedures. In the March 11, 2010 Order Modifying and Approving Article 405 Operations Monitoring Plan, reference is made to a yet-to-be-completed hydrologic model for the Dead River. It seems that UPPCO's ability to predict spring runoff at the time of the typical consultation meeting is limited, especially following the retirement of one of their experienced staff. This was not clear to all representatives during previous consultations. After numerous exchanges of information, it is also not clear whether the model anticipated in the March 11, 2010 Order is in use as envisioned, and what the efficacy of the model is compared to guessing.

<u>Regarding UPPCO's 2017 Recommendations:</u>

Overall, MDNR and UPPCO seem to interpret the intent of the Test Period differently. UPPCO's interpretation is best illustrated in pages 15 and 16 of UPPCO's 2017 Report: "Recommendations to Modify Project Operations to Achieve Compliance" where a number of the recommendations are to change or eliminate target elevations. It seems that rather than demonstrating its ability to operate in a manner that would meet license requirements, UPPCO is seeking to change license requirements to match its desired operation.

It does not seem that the objectives for the Three Year Test Period have been met. Nonetheless, MDNR wishes to comment on what has been presented so far, understanding that

the Test Period may not be extended, and given that UPPCO has already agreed to drop a number of its recommended changes:

Recommendations UPPCO has abandoned as a result of follow up discussions with MDNR and MDEQ:

Silver Lake Storage Basin:

- None- UPPCO has maintained its recommendations detailed in the 2017 report.

Dead River Storage Basin (DRSB or Hoist):

- Item 3. Change the April and May minimum reservoir elevation for the DRSB to 1334.0 feet NGVD (dropped per discussion on December 11, 2017)
- Item 4. Eliminate the start of month target elevations for March and April (dropped December 11, 2017, and reiterated in follow up calls with MDEQ).

McClure:

- None – UPPCO has proposed no changes.

MDNR Comments and Recommendations:

MDNR's overall aquatic habitat protection goal is to minimize and mitigate the negative impacts of hydroelectric facilities. MDNR seeks to ensure projects operate in a manner that protects and maintains aquatic environments and fish communities and rehabilitates those that are currently degraded. In the Dead River, habitat has been fragmented by multiple developments leading to areas with mostly-riverine aquatic resources, as well as aquatic communities in impoundments. It is not lost on MDNR that the manner in which elevations and flows are managed directly impacts water quality within the impoundments and downstream. MDNR and MDEQ are still trying to work with UPPCO to understand what options might be available to reduce the instances of temperatures exceeding standards during extended periods at some sites. UPPCO has claimed that high temperatures are unavoidable and relate to lack of vegetation in the rebuilt riverine reach downstream of Silver Lake. Even if this were a primary driver, MDNR would be reluctant to support protective standards being relaxed considering that vegetation is expected to regenerate over time. Doing so would very likely have a negative impact on both riverine and impoundment fisheries and aquatic resources. Because no changes to minimum flows or drawdown rates are being proposed, and water quality concerns, especially in riverine reaches, are complex enough to require additional discussion, MDNR's comments are focused on the effect of project operations on fisheries within the impoundments.

Silver Lake Storage Basin:
As is true for all impoundments, MDNR is concerned about unconstrained fluctuations in elevations in Silver Lake Storage Basin. The Test Period has not been adequate to inform the likely effects of the proposed operations on fisheries and aquatic resources at Silver Lake or downstream following the refill. Currently, Dead River Mitigation Consent Judgment funds from the 2003 flood event are being used to develop a sport-fishery for bluegill in the Silver Lake Storage Basin. Bluegill are expected to spawn in June, and fluctuations in elevation during this critical time would threaten the success of that fishery. The investment in the fishery would likely go to waste if operations and reservoir levels are managed in a manner inconsistent with the current license.

It seems that UPPCO is proposing eliminating start of month target elevations from "spring runoff" until October for Silver Lake Storage Basin. Rather than listing target elevations for Silver Lake Storage Basin in the interim, UPPCO recommends eliminating target elevations for Silver Lake, while reiterating those for Hoist. MDNR had not fully appreciated this part of UPPCO's recommendation at the time of the December 11th meeting. It seems that absent

target elevations, Silver Lake Basin would fluctuate without an upper elevation restriction and only be limited by the physical capacity of the spillway. MDNR believes the Commission already addressed this condition in its 2010 Order:

> "(47) UPPCO's interpretation of the license does not reflect the intent of the license to restrict reservoir level fluctuations. While the minimum elevation requirements provide a lower elevation boundary, UPPCO's proposal would not provide an upper elevation restriction after achieving the start of month target elevation."

Modifications to, or even elimination of target elevations to allow the capture of spring runoff could be justified, but only if they were for a more limited time-period than has been recommended by UPPCO, and only if the changes were more narrowly aimed at when spring runoff occurs. For the period following spring runoff, rather than eliminating targets as UPPCO has proposed, either existing targets should be maintained or an alternative target of some sort should be proposed. Whether the alternative is a maximum rate of change between months, maximum decrease from post-runoff elevation, or a specific target elevation, the willingness of MDNR to support elimination of protective requirements to allow additional storage is limited by lack of information about likely impacts of doing so. With UPPCO's current proposal, it is impossible to know the degree and duration of fluctuations UPPCO's operations would cause in the system for over half of the year without the relatively flexible constraint target elevations have provided (see examples of past modifications outlined by UPPCO, and notes by FERC regarding expected fluctuations due to precipitation or lack of precipitation). More information and justification should be provided by UPPCO.

Hoist:
UPPCO's 2017 recommendations include changing the May start of month target elevation for Hoist to 1341.0 feet NGVD, from the current target of 1340.0 feet NGVD. This proposed change, as it is currently understood, would potentially impact walleye spawning in May at Hoist, and require changes to water elevations in Silver Lake to support the higher elevation at Hoist. The best way to protect walleye recruitment is to ensure stable elevations in Hoist in May. We believe that if UPPCO manages the system carefully, allowing a one foot increase in the May start of month target at Hoist may be acceptable. Having basin elevations at Hoist trending higher sooner may require Silver Lake to be drawn down and allowed to refill. It is not clear what the long term impacts of this process would be, but provided that the other license conditions are met, and the system is holding at a stable elevation in the lead up to the bluegill spawning season at Silver Lake, allowing that change may have minimal negative impact on the investment in improving fishing opportunities which is planned for the next several years. Should it be discovered that there are negative environmental effects of allowing this change; the target elevation should be restored to its original level. For example, if operational requirements undertaken by UPPCO to support increasing the target elevation at Hoist are determined by local fisheries managers to negatively impact bluegill spawning or recruitment, MDNR would seek to restore the original level. At this time, MDNR is not aware of any anticipated negative impacts of 1341.0 compared to 1340.0. Failure to manage May water level fluctuations to be protective of fish spawning with either the current or proposed target elevation of 1341.0 would have negative impacts on spawning walleye.

McClure:
No changes proposed. Recommended changes per 2016 report were not carried forward in 2017 Report. In our December 11, 2017 meeting, flushing flows downstream of McClure were briefly discussed. It is our understanding that misconceptions regarding the frequency of flushing flows required to maintain geomorphic conditions downstream will be resolved

separately (it is anticipated that frequency of flushing flows would approximate hydrograph of bankfull events and occur at similar times of year, durations, and frequencies as bankfull events in less disturbed systems, for the purpose of preventing injurious sedimentation and allowing movement of woody debris).

Thank you for the opportunity to comment. If you have any questions or feel additional clarification would help, please feel free to contact me at:

MARQUETTE CUSTOMER SERVICE CENTER
MICHIGAN DEPARTMENT OF NATURAL RESOURCES
1990 US HWY 41 SOUTH
MARQUETTE MI 49855

Sincerely,

Elle Gulotty
Resource Analyst
Habitat Management Unit
FISHERIES DIVISION
(906) 228-6561 x 3002

cc: Burr Fisher, USFWS, E. Lansing
Amira Oun, Michigan DEQ, Lansing, MI
Jessica Mistak, HMU Supervisor, Escanaba Field Office, Gladstone MI
George Madison, Fisheries Manager, West Lake Superior Management Unit, Baraga MI

Response to MDNR comments received December 21, 2017

MDNR Comment (1):
Background on the Three Year Test Period:

As described in the Commission's March 11, 2010 Order Modifying and Approving Article 405 Operations Monitoring Plan, the purpose of the Three Year Test Period was:

"(8)…to determine the licensee's ability to comply with the storage basin water levels required by Article 402 and minimum flows required by Article 403, to begin after flow monitoring is implemented;"

UPPCO Response (1):
The MDNR correctly included the description of the test period from Article 405 of the project license. However, the purpose of the test period is also discussed on Page 59 of the EA and the discussion is as follows with emphasis added:

"Using streamflow data modeled in UPPCO's license application (UPPCO, 1994), the staff reviewed UPPCO's ability to meet both minimum flow requirements and **reservoir operation requirements for SLSB that were specified in the WQC**. Our analysis indicates that the specified minimum flows required by the WQC would make it difficult for fill the SLSB between May and June and could lead to noncompliance with the minimum reservoir elevation criteria during the summer months (1 year in May, 7 years in June, 3 years in July and 1 in August) for the 10 years that data were analyzed (1983-1992). The MDEQ appears to anticipate this situation and provides in the WQC for consultation with them and MDNR in case of noncompliance. The minimum flow regime recommended by MDNR would result in drawdowns below the minimum elevation for 1 year in May, 8 years in June, 5 years in July, 3 years in August, out of the 10 years analyzed. The continuous minimum flows from SLSB of 8 cfs proposed by UPPCO and the 15 cfs requested by Mr. Weglarz would result in drawdowns in at least 4 out of 10 years, in June. In the DRSB, we estimate the potential non-compliance with minimum level to be in 1 year during August. We recognize that the WQC conditions are mandatory. However, from a compliance perspective, we are concerned that the proposed WQC conditions may cause a number of minimum level noncompliance events. As further discussed under compliance monitoring, we recommend UPPCO, in consultation with the resource agencies and the MDEQ, evaluate streamflow data and reservoir levels during the first 3 years following issuance of any license for the Dead River Project. **The evaluation should focus on whether any operations changes need to be made to ensure compliance with the license and the WQC conditions**."

The paragraph stated above refers to the reservoir elevations outlined in the water quality certification (and subsequently Article 402 of the license) as "operation requirements." The final sentence in the paragraph above states "The evaluation should focus on whether any **operations changes** need to be made to ensure compliance with the license and the WQC conditions." Therefore, it is clear to UPPCO the purpose of the test period is to look at reservoir operation requirements, which are the changes UPPCO has proposed in the test report.

MDNR Comment (2):
UPPCO in its proposed plan characterized the Test Period as consisting of three "normal" water

years. If a Test Period year does not meet this definition, UPPCO stated that the test year must be repeated, and that the Test Period would begin when conditions for the Silver Lake Refill Plan are fulfilled. While the refill plan may have been considered met when the Test Period began, Silver Lake was drawn down to prepare for construction in spring of 2015 and did not resume normal operation until May of 2017, reducing MDNR's ability to draw conclusions about the effects of future operations based on the Test Period.

In its response to the 2016 Three Year Test Period Report, MDNR noted that the conditions during Test Periods was highly variable (We are not aware of UPPCO documenting whether any of the test report years constituted a "normal" water year per the Operations Monitoring Plan or 2010 Commission Order), and that the system was still adjusting (referring both to the refill of Silver Lake, and the ecological conditions in the rebuilt channel and downstream post-2003.) The examples of deviations documented by UPPCO further complicated our review. Thus, MDNR requested an extension, in part, expecting that providing an additional year of data and time to formulate its response would allow UPPCO to "develop an analysis in support of its future proposed target elevations." This expectation has not been fully met. As of the 2016 report, UPPCO proposed eliminating targets for Hoist in March and April. At the time it was unclear what operations would look like under various environmental conditions (including water availability) without those targets. It still is unclear what UPPCO's operation would look like; this recommendation was retained in UPPCO's 2017 Report, but subsequently dropped in follow-up conversations.

UPPCO Response (2):

The comment above correctly reflects what UPPCO proposed in its proposed monitoring plan provided to the Commission on October 6, 2008 for approval. However, the MDNR in their September 4, 2008 comment letter stated the following with emphasis added:

6.0 Three-Year Test Period

- Instead of the test period beginning January 1, 2010, or the year after Silver Lake refills to elevation 1481 feet, we recommend that the three-year test period commence at the same time as the Operations Monitoring Plan (i.e., after Silver Lake reaches the monthly target elevation, regardless of the month in which this occurs).
- Since the purpose of the test period is "to allow the applicant and the agencies to review potential compliance issues over a reasonable range of natural conditions" (see page 58 of the July 2002 Dead River Final Environmental Assessment), the test period should occur during the three consecutive years following Silver Lake reaching monthly target elevation, not merely years defined as "normal".

Test Period Conclusion

- A request to modify license conditions should only be submitted if warranted. Any request must also consider negotiated mitigation items included in the license and protection of natural resources in addition to UPPCO's ability to meet operating conditions.

If you have any questions about this matter, please contact me at 906-249-1611 ext 308 or mistakjl@michigan.gov. If you wish to contact me in writing, my address is:
Marquette Fisheries Station
Michigan Department of Natural Resources
484 Cherry Creek Rd
Marquette, MI 49855

Sincerely,

Jessica Mistak

Jessica Mistak, Senior Fisheries Biologist

The Commission in their March 11, 2010 Order (Order) discussed the comment[5] and

[5] The Order references the comment arising from the MDEQ. However, under the review of the record by UPPCO, it cannot find a reference to

stated the following:

> **Three Year Test Period**
>
> 62. UPPCO states that the three year test period will consist of three "normal" water years defined as a calendar year in which the average flow as measured at the USGS Gage located on the Middle Branch of the Escanaba River (No. 04057800) is within plus or minus 10% of the average calendar year flow for the period of record for that same gage. If a test period year does not meet this definition, the licensee states that the test year must be repeated. The MDEQ recommended that the three year test period occur during three consecutive years in order to allow the licensee and the agencies "to review potential compliance issues over a reasonable range of natural conditions" (quoting the EA prepared for licensing).
>
> 63. Commission staff concurs with MDEQ. The EA refers to testing operations during a reasonable range of natural conditions and recognizes that there may be compliance difficulties related to maintaining reservoir water levels and minimum flows at the project developments, especially in dry years. Therefore, it is important to include such years in the evaluation. Moreover, should any party determine the need for the test period to be extended, recommendations and discussion could occur toward the end of the three year test period as part of the report that the licensee proposes to prepare.

Through the Commission's analysis and the comments of the MDNR, the Commission ordered in Paragraph (G) of the Order that "The licensee shall conduct operations testing for three consecutive years and file with the Commission, annual operations testing reports within 4 months of completing a test year."

Although changes in operation due to work at the SLSB was not anticipated in UPPCO's original proposal to use "normal" years for the test period, the MDNR's insistence on "three consecutive years" served the basis for the current requirement in paragraph (G) of the Order. UPPCO can understand the need for "normal" years to evaluate impacts, but drawdowns and restricted operation at a facility during any given year is a normal part of the "reasonable range of natural conditions" (quoting the EA prepared for licensing) that can be experienced in the future.

The need to provide storage of spring runoff in SLSB each year was demonstrated to stakeholders with the drawdown of SLSB which began in the spring of 2015. In addition, restricted operation at SLSB from spring of 2015 to spring of 2017, also demonstrated how the SLSB and the DRSB are not independent of each other. If one storage basin is restricted (SLSB), the other basin is also impacted and changes in operation may be necessary in the second storage basin.

During the fall of 2015 until December 28, 2015, UPPCO initiated the dry-year consultation process because minimum elevations could not be maintained at the DRSB lacking the ability for UPPCO to draw water from SLSB under its state of drawdown.[6]

During the spring of 2016, UPPCO initiated a planned deviation period for the DRSB target elevations, recognizing SLSB would not be available to provide stored water to the DRSB

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the comment provided by the MDEQ. It can only find a reference to the MDNR making the comment on September 4, 2008.

[6] See Planned deviation reports to FERC dated September 23, 2015 and January 14, 2016 (Submittals 20150923-5049 and 20160114-5246 respectively).

in the summer recreation period under its state of drawdown.[7] UPPCO requested to target an elevation of 1342.0 feet NGVD with storage up to 1343.0 feet NGVD at the DRSB during spring runoff. This resulted in a minimum reservoir elevation during the summer recreation season of approximately 1340.0 feet NGVD during late August of 2016.

Even though the 2015-2016 test period showed the importance of storing water in SLSB for achieving and maintaining recreation reservoir elevations (1341.0 feet NGVD) at the DRSB, the test period was extended for one additional year and that fourth year of testing was conducted.

The evaluation of a "normal" year is not required. UPPCO explained this to the MDNR at the December 11, 2017 meeting before they made their comments.

To address the changes in operation at SLSB, the test period was extended for one additional year and a fourth year of testing was conducted. The entire period was adequate to "develop an analysis in support of its future proposed target elevations" and that analysis is included in the summary of the four years of operations testing section of the test report. Consequently, none of the points in the summary have been contested by the MDNR.

Adequate time has been provided to draw conclusions about the impact of the proposed operations.

MDNR Comment (3):
In the intervening time, UPPCO has provided a summary of conditions under which it sought planned deviations or did not meet targets as required, but has not provided a narrative detailing how its proposed changes to the license would affect aquatic resources or flows through the system, or detailed how elevations would be managed absent targets.

UPPCO Response (3):
Per a telephone conversation with the MDEQ on January 3, 2018, UPPCO emailed to the MDEQ, MDNR, and FWS a revised recommendation to better address MDEQ concerns. The email was provided for their comment on January 3, 2018.

Per additional telephone conversations with MDEQ on January 4, 2018 and an email from the MDNR on January 3, 2018, UPPCO provided a revised report incorporating the changes recommended in the January 3, 2018 email via email to the MDEQ, MDNR, and FWS for comment on January 4, 2018. The MDNR provided their first set of comments on the January 4, 2018 on January 9, 2018. Any comments received from the MDNR on the January 4, 2018 revised report are addressed separately.

Since the start of the test period (August 5, 2013), UPPCO has been attempting to operate SLSB to store water after spring runoff (except for the required maintenance drawdown period). This operation is consistent with the overall recommendations contained in the revised report provided on January 4, 2018.

Due to the changes to operation requirements, UPPCO monitored for erosion on the

[7] See Planned deviation reports to FERC dated March 25, 2016 and October 5, 2016 (Submittals 20160325-5072 and 20161005-5128 respectively).

DRSB in the spring of 2013, in August of 2015, and during the spring of 2016. In addition, UPPCO is required to monitor for erosion every five years on the shoreline of both the SLSB and DRSB and address erosion as required by Article 401. To date, UPPCO has not identified any project induced erosion.

Regarding impacts to aquatic resources under the test period, the storage of cooler water upstream in the SLSB during the early summer and release during mid to late summer will cool the waters downstream.

Regarding other adverse aquatic impacts experienced during the test period, UPPCO is not aware of any impacts occurring, has not received any complaints of such adverse impacts during the test period, and has not received any information from the MDNR stating such impacts have occurred.

During the test period, the following significant SLSB reservoir elevation changes were made from before spring runoff to after spring runoff:

Year	Approximate SLSB Reservoir Elevation (feet NGVD)		Elevation Change (feet)
	Prior to Spring Runoff	*After Spring Runoff*	
2014	1476.0	1484.6	8.6
2015	1477.6	1482.5	4.9
2016[8]	1477.0	1481.1	4.1
2017	1482.3	1485.2	2.9

[8] The SLSB was refilling during this period from the required 2015 maintenance drawdown.

MDNR Comment (4):
Instead UPPCO describes license conditions as "arbitrary restrictions." While MDNR understands there are times when precipitation or other events outside UPPCO's control could make meeting target elevations or other parameters of the license difficult or impossible, the existence of those license parameters is important and necessary outside of those anomalous events; where the primary drivers of flow conditions, elevations and environmental impacts are a result of decisions of UPPCO in operating its facilities. In the license Environmental Assessment, the Commission considered whether to concur with the water quality certification (WQC) developed by MDEQ. The Commission weighed the benefits of reduced reservoir level fluctuations for fisheries, shoreline vegetation, and recreation along with the UPPCO's ability to maintain minimum flows, and generate power. It is MDNR's conclusion that based on prior determinations by the Commission with consideration of both agency comments and UPPCO's concerns, the parameters of the WQC and the license are not arbitrary.

UPPCO Response (4):
UPPCO has removed the term "arbitrary" from the revised report, but still supports its use in describing several license target elevations that were modified to new elevations during the test period. See also UPPCO Response (12).

MDNR Comment (5):
In the case of Hoist, if targets were eliminated for March and April, it seems likely that the meeting with agencies and stakeholders would be when UPPCO shares its proposed plan for reservoir elevation management.

UPPCO Response (5):
UPPCO has withdrawn its recommendation to eliminate the target elevations for March and April. As the MDNR comments later state, UPPCO explained this to the MDNR at the December 11, 2017 meeting before they made their comments. Therefore, this comment is unnecessary.

MDNR Comment (6):
Consultation (either prior to spring runoff or for 'dry years') has been haphazard in the recent past.

UPPCO Response (6):
The MDNR provides no data to support this opinion. It is well documented, in each of the test periods, that consultation occurs prior to spring runoff. It is also well-documented through deviation reports when consultation occurs in dry-year consultation. The MDNR has been invited to attend each consultation, but have not always provided comments.

MDNR Comment (7):
Poor predictive ability of UPPCO regarding spring runoff and other events are going to be problematic in the absence of standard procedures. In the March 11, 2010 Order Modifying and Approving Article 405 Operations Monitoring Plan, reference is made to a yet-to-be-completed hydrologic model for the Dead River. It seems that UPPCO's ability to predict spring runoff at the time of the typical consultation meeting is limited, especially following the retirement of one of their experienced staff. This was not clear to all representatives during previous

consultations.

UPPCO Response (7):
UPPCO has withdrawn its recommendation to eliminate the target elevations for March and April. As the MDNR comments later state, UPPCO explained this to the MDNR at the December 11, 2017 meeting before they made their comments. Therefore, the comment about the absence of standard procedures (target elevations) has been addressed.

UPPCO is uncertain if the MDNR is stating the abilities of UPPCO regarding predicting spring runoff is deficient, or the accuracy of the predictions is limited. Regardless, UPPCO attempted to explain the difficulties of predicting spring runoff at the December 11, 2017 meeting. UPPCO would like to take this opportunity to further-explain the difficulties associated with predicting spring runoff inflow in the paragraphs below.

UPPCO completed a hydrologic model in 2009, which was later supplemented with current data through 2016. The hydrologic model will be updated as UPPCO deems necessary and may be used to make internal operational decisions. However, the model is only one tool to help predict spring runoff inflow. Other tools include snow pack information, snow water equivalent information and past operational activities.

The problem with predicting spring runoff inflows to the Dead River System is not lack of data or a misunderstanding of how the river system reacts to inflow or snowpack. UPPCO has over 38 years of historical data in the model that demonstrates how the Dead River System responds to spring runoff.

The data on snowpack and rate of snowmelt is much more limited, but can be useful in setting storage basin elevations prior to spring runoff.

The major limitations to anticipating any spring runoff inflow are predicting the weather at the time of spring snowmelt (at least one month in advance) and predicting the rate at which the snow will melt (Does rain melt the snow quickly? How much water is actually contained in the snowpack? Does a 70-degree day melt the snow? Is it windy when the snow melts? How saturated is the soil? Is the vegetation actively taking in water at the time of the snowmelt? How deep is the frost in the forested areas? Does it melt slowly over a few weeks?).

If UPPCO can predict the rate and quantity of snowmelt and use a previous year for comparison, they can gain a better understanding of what the system will receive for inflow.

Since UPPCO cannot predict the rate of snowmelt nor the weather at the time snowmelt occurs, an annual consultation meeting is recommended. The annual consultation meeting will be conducted with stakeholders to present available data, discuss prediction limitations and viewpoints, and discuss recommendations as a group so that all in attendance understand the basis for the potential changes in operation and/or planned deviations.

MDNR Comment (8):
After numerous exchanges of information, it is also not clear whether the model anticipated in the March 11, 2010 Order is in use as envisioned, and what the efficacy of the model is compared to guessing.

UPPCO Response (8):
How the model is used and its limitations are described above in UPPCO Response 7.

MDNR Comment (9):
Regarding UPPCO's 2017 Recommendations:

Overall, MDNR and UPPCO seem to interpret the intent of the Test Period differently. UPPCO's interpretation is best illustrated in pages 15 and 16 of UPPCO's 2017 Report: "Recommendations to Modify Project Operations to Achieve Compliance" where a number of the recommendations are to change or eliminate target elevations. It seems that rather than demonstrating its ability to operate in a manner that would meet license requirements, UPPCO is seeking to change license requirements to match its desired operation.

It does not seem that the objectives for the Three Year Test Period have been met. Nonetheless, MDNR wishes to comment on what has been presented so far, understanding that the Test Period may not be extended, and given that UPPCO has already agreed to drop a number of its recommended changes:

Recommendations UPPCO has abandoned as a result of follow up discussions with MDNR and MDEQ:
Silver Lake Storage Basin:
- *None- UPPCO has maintained its recommendations detailed in the 2017 report. Dead River Storage Basin (DRSB or Hoist):*
- *Item 3. Change the April and May minimum reservoir elevation for the DRSB to 1334.0 feet NGVD (dropped per discussion on December 11, 2017)*
- *Item 4. Eliminate the start of month target elevations for March and April (dropped December 11, 2017, and reiterated in follow up calls with MDEQ). McClure:*
- *None – UPPCO has proposed no changes.*

UPPCO Response (9):
Regarding the purpose of the test period, please see UPPCO Response (1). Regarding the recommendations abandoned by UPPCO, the MDNR's list is correct.

MDNR Comment (10):
MDNR Comments and Recommendations:

MDNR's overall aquatic habitat protection goal is to minimize and mitigate the negative impacts of hydroelectric facilities. MDNR seeks to ensure projects operate in a manner that protects and maintains aquatic environments and fish communities and rehabilitates those that are currently degraded. In the Dead River, habitat has been fragmented by multiple developments leading to areas with mostly-riverine aquatic resources, as well as aquatic communities in impoundments. It is not lost on MDNR that the manner in which elevations and flows are managed directly

impacts water quality within the impoundments and downstream. MDNR and MDEQ are still trying to work with UPPCO to understand what options might be available to reduce the instances of temperatures exceeding standards during extended periods at some sites.

UPPCO has claimed that high temperatures are unavoidable and relate to lack of vegetation in the rebuilt riverine reach downstream of Silver Lake. Even if this were a primary driver, MDNR would be reluctant to support protective standards being relaxed considering that vegetation is expected to regenerate over time. Doing so would very likely have a negative impact on both riverine and impoundment fisheries and aquatic resources. Because no changes to minimum flows or drawdown rates are being proposed, and water quality concerns, especially in riverine reaches, are complex enough to require additional discussion, MDNR's comments are focused on the effect of project operations on fisheries within the impoundments.

UPPCO Response (10):

Although operation releases impact water quality, UPPCO's operation recommendations serve as a basis for storage of cooler water upstream in the SLSB during the early summer and release during mid to late summer. The storage of cooler water upstream in the SLSB during the early summer and release during mid to late summer will cool the waters downstream.

The water temperature downstream of Silver Lake has been shown to be heavily influenced by reduced shading from lack of tall vegetation planted during the stream rebuild project 2005-2007.

UPPCO monitored water quality in the Dead River system in 2017 and will again be monitoring in the 2018 season. Any specific comments on water quality and temperatures that do not have a connection to the test period should be addressed as part of water quality monitoring reports.

MDNR Comment (11):

Silver Lake Storage Basin:

As is true for all impoundments, MDNR is concerned about unconstrained fluctuations in elevations in Silver Lake Storage Basin. The Test Period has not been adequate to inform the likely effects of the proposed operations on fisheries and aquatic resources at Silver Lake or downstream following the refill. Currently, Dead River Mitigation Consent Judgment funds from the 2003 flood event are being used to develop a sport-fishery for bluegill in the Silver Lake Storage Basin. Bluegill are expected to spawn in June, and fluctuations in elevation during this critical time would threaten the success of that fishery. The investment in the fishery would likely go to waste if operations and reservoir levels are managed in a manner inconsistent with the current license.

UPPCO Response:

Per a telephone conversation with the MDEQ on January 3, 2018, UPPCO emailed to the MDEQ, MDNR, and FWS a revised recommendation to better address MDEQ concerns. The email was provided for their comment on January 3, 2018.

Per additional telephone conversations with MDEQ and an email from the MDNR both on January 4, 2018, UPPCO provided a revised report via email to the MDEQ, MDNR, and

FWS for comment on January 4, 2018. On January 9, 2018, the MDNR responded via email to the revised report with comments. Any comments received from the MDNR on the January 4, 2018 revised report are not addressed here but will be addressed independent of these responses to comments received on December 21, 2017.

In the January 4, 2018 revised report, UPPCO recommended SLSB target elevations of 1485.04 feet NGVD for May, June, and July. The recommended SLSB target elevations for May, June, and July support steady SLSB elevations for the critical bluegill spawning period by requiring UPPCO to target the same SLSB elevation from May 1 to July 1 of each year.

MDNR Comment (12):

It seems that UPPCO is proposing eliminating start of month target elevations from "spring runoff" until October for Silver Lake Storage Basin. Rather than listing target elevations for Silver Lake Storage Basin in the interim, UPPCO recommends eliminating target elevations for Silver Lake, while reiterating those for Hoist. MDNR had not fully appreciated this part of UPPCO's recommendation at the time of the December 11th meeting. It seems that absent target elevations, Silver Lake Basin would fluctuate without an upper elevation restriction and only be limited by the physical capacity of the spillway. MDNR believes the Commission already addressed this condition in its 2010 Order:

"(47) UPPCO's interpretation of the license does not reflect the intent of the license to restrict reservoir level fluctuations. While the minimum elevation requirements provide a lower elevation boundary, UPPCO's proposal would not provide an upper elevation restriction after achieving the start of month target elevation."

UPPCO Response (12):

UPPCO recommended in the October 24, 2017 report to eliminate target elevations at SLSB from the period prior to spring runoff through October 1. This recommendation was based on the amount of water available prior to spring runoff and during the recreation season through October 1 and the water needs in maintaining the reservoir elevation targets at the DRSB during the summer recreation period.

Without starting target elevations at SLSB during that period:

1) The upper reservoir elevation would be dictated by the spillway elevation of 1485.02 feet NGVD (any elevation over the spillway elevation is automatically released downstream equivalent to its inflow).
2) The releases from SLSB when the reservoir is full (elevation 1485.02) become run-of-river releases downstream.
3) If UPPCO removes more water from SLSB than necessary to maintain 1341.0 feet NGVD at the DRSB (May 1 through November 1), UPPCO would not meet its target elevation requirement at DRSB and SLSB November 1 each year.
4) If UPPCO draws down the SLSB too far prior to spring runoff (does not meet the April 1 target), SLSB will not have enough water to meet the November 1 target in that year.
5) The maximum hydraulic release from Silver Lake is already limited by Article 403 to 150 cfs or 200 cfs under specific conditions.
6) The rate of lowering at SLSB and DRSB is already limited to 0.5 feet by Article 402.

The test period has demonstrated the operational needs before and during spring runoff are dictated by the weather. The amount of water that needs to be stored at SLSB after spring runoff and how long it needs to be stored is also dictated by the weather.

The test period has demonstrated weather prediction abilities of all stakeholders is limited.

Therefore, UPPCO recommended eliminating target elevations at SLSB and DRSB that are dictated by weather. If those target elevations that are dictated by weather are stated as license requirements, they are arbitrary because they are not based on the weather for a given season. UPPCO will be required to request planned deviations accordingly.

UPPCO recommended SLSB target elevations of 1485.04 feet NGVD for May, June, and July in the January 4, 2018 revised report at the request of MDEQ and MDNR.

The recommended SLSB target elevations for May, June, and July are expected to result in steady SLSB elevations during May, June, and July, but the actual elevations of SLSB during this period will be determined by the weather.

In addition, in the January 4, 2018 revised report, UPPCO recommended SLSB start of month target elevations for August and September that would avoid the requirement for UPPCO to lower the SLSB elevation from 1485.04 feet NGVD on July 1 to the current August 1 target of 1480 feet NGVD (over five feet) in one month.

The information in support of the recommended changes was provided to the agencies in its email dated January 3, 2018 and again in the January 4, 2018 email submitting the revised report for comments.

The information is re-stated below:

Shawn Puzen

From:	Shawn Puzen
Sent:	Wednesday, January 03, 2018 10:42 AM
To:	Oun, Amira (DEQ)
Cc:	Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; 'Kruger, Kyle (DNR)'; Kohlhepp, Gary (DEQ); 'burr_fisher@fws.gov'; 'Gulotty, Elle (DNR)'
Subject:	Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.
Categories:	Filed by Newforma

Good Morning Amira,

In looking through the comments you provided to UPPCO on the three year test period, UPPCO has a recommendation it would like to provide before it responds to your comments.

Under Silver Lake Storage Basin Comment 1, you stated the following:

> Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO appreciates MDEQ taking the time to understand the need to store water at Silver Lake following spring runoff and understands the MDEQ need to name target elevations. UPPCO did not include start of month target elevations for the period following spring runoff through September 1 because the weather experienced during spring runoff and the summer months drives the storage needs at Silver Lake.

However, UPPCO will amend the three-year test period report to include start of month target elevations for May, June, and July of 1485.2 feet NAVD or 1485.04 feet NGVD. UPPCO agrees with the MDEQ and believes those target elevations will assist in operating the Dead River System as originally intended.

Under the MDEQ proposal, the target elevation for July 1 is 1485.04 feet NGVD and the target elevation for August 1 is 1480 feet NGVD. This would require UPPCO to strive to lower the Silver Lake Storage basin (releasing the majority of the stored water) starting July 2 approximately 5 feet to meet the start of month target elevation of 1480 feet NGVD by August 1.

In looking at the information on basin inflows provided by the Commission in the August 5, 2002 Final Environmental Assessment, Page 41 state the following:

Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station, USGS gaging station 04043800, located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[7] There are a few months of USGS data from the early

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[7] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited. The penstock was repaired by February 1998 and the stream restoration efforts were successful.

On or about October 22, 1990, there was a failure of a clay tile drainage pipe

Although the record is slight regarding annual average inflows into the Dead River Storage Basin, they are indicative of what UPPCO has experienced with average inflows dropping to near or less (considering evaporation) than the required 100 cfs minimum flow release from the Dead River Storage Basin for August and September.

That being said, under the current MDEQ proposal, most of the stored water would be required to be released in July, when stored water will be needed to augment flows into the Dead River Storage Basin during August and September also (depending upon weather).

Therefore, UPPCO proposes to set the Start of Month Targets as follows in the test period report to allow for Silver Lake Storage Basin to still provide storage and augment flows into the Dead River Storage Basin in August and September:
(the recommended changes from the MDEQ proposal are marked in red)

May	**1485.04 feet NGVD**
June	**1485.04 feet NGVD**
July	**1485.04 feet NGVD**
August	**1483.2 feet NGVD**
September	**1481.4 feet NGVD**
October	**1479.5 feet NGVD**

This will allow UPPCO to utilize approximately 1.8 feet of storage during the month of July, August, and September. If the weather at the time dictates otherwise, UPPCO will have to consult for a planned deviation.

Please provide me your comments on this most-recent proposal.

Thank you.

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
Mead & Hunt | 1345B North Road | Green Bay, WI 54313
Direct: 920-593-6865 | Mobile: 920-639-2480
shawn.puzen@meadhunt.com | meadhunt.com

MDNR Comment (13):

Modifications to, or even elimination of target elevations to allow the capture of spring runoff could be justified, but only if they were for a more limited time-period than has been

recommended by UPPCO, and only if the changes were more narrowly aimed at when spring runoff occurs. For the period following spring runoff, rather than eliminating targets as UPPCO has proposed, either existing targets should be maintained or an alternative target of some sort should be proposed. Whether the alternative is a maximum rate of change between months, maximum decrease from post-runoff elevation, or a specific target elevation, the willingness of MDNR to support elimination of protective requirements to allow additional storage is limited by lack of information about likely impacts of doing so. With UPPCO's current proposal, it is impossible to know the degree and duration of fluctuations UPPCO's operations would cause in the system for over half of the year without the relatively flexible constraint target elevations have provided (see examples of past modifications outlined by UPPCO, and notes by FERC regarding expected fluctuations due to precipitation or lack of precipitation). More information and justification should be provided by UPPCO.

UPPCO Response (13):
Per additional telephone conversations with MDEQ on January 4, 2018 and a January 3, 2018 email from MDNR, UPPCO provided a revised report via email to the MDEQ, MDNR, and FWS for comment on January 4, 2018.

MDNR Comment (14):
Hoist:
UPPCO's 2017 recommendations include changing the May start of month target elevation for Hoist to 1341.0 feet NGVD, from the current target of 1340.0 feet NGVD. This proposed change, as it is currently understood, would potentially impact walleye spawning in May at Hoist, and require changes to water elevations in Silver Lake to support the higher elevation at Hoist. The best way to protect walleye recruitment is to ensure stable elevations in Hoist in May. We believe that if UPPCO manages the system carefully, allowing a one foot increase in the May start of month target at Hoist may be acceptable. Having basin elevations at Hoist trending higher sooner may require Silver Lake to be drawn down and allowed to refill. It is not clear what the long term impacts of this process would be, but provided that the other license conditions are met, and the system is holding at a stable elevation in the lead up to the bluegill spawning season at Silver Lake, allowing that change may have minimal negative impact on the investment in improving fishing opportunities which is planned for the next several years. Should it be discovered that there are negative environmental effects of allowing this change; the target elevation should be restored to its original level. For example, if operational requirements undertaken by UPPCO to support increasing the target elevation at Hoist are determined by local fisheries managers to negatively impact bluegill spawning or recruitment, MDNR would seek to restore the original level. At this time, MDNR is not aware of any anticipated negative impacts of 1341.0 compared to 1340.0. Failure to manage May water level fluctuations to be protective of fish spawning with either the current or proposed target elevation of 1341.0 would have negative impacts on spawning walleye.

UPPCO Response (14):
UPPCO agrees there are not any anticipated negative impacts of 1341.0 feet NGVD compared to 1340.0 feet NGVD. UPPCO has not observed any adverse impacts while targeting 1341.0 feet during the test period. Over the four years of the test period, the DRSB reservoir elevation exceeded 1341.0 feet NGVD prior to May 1 during three of the

years, which include 2015, 2016, and 2017. In 2014, the DRSB exceeded 1341.0 feet NGVD on May 3.

MDNR Comment (15):
McClure:
No changes proposed. Recommended changes per 2016 report were not carried forward in 2017 Report. In our December 11, 2017 meeting, flushing flows downstream of McClure were briefly discussed. It is our understanding that misconceptions regarding the frequency of flushing flows required to maintain geomorphic conditions downstream will be resolved separately (it is anticipated that frequency of flushing flows would approximate hydrograph of bankfull events and occur at similar times of year, durations, and frequencies as bankfull events in less disturbed systems, for the purpose of preventing injurious sedimentation and allowing movement of woody debris).

UPPCO Response (15):
Comment noted.

UPPCO's January 3, 2018 revised recommendation based upon a January 3, 2018 telephone conversation with MDEQ

Shawn Puzen

From:	Shawn Puzen
Sent:	Wednesday, January 03, 2018 10:42 AM
To:	Oun, Amira (DEQ)
Cc:	Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; 'Kruger, Kyle (DNR)'; Kohlhepp, Gary (DEQ); 'burr_fisher@fws.gov'; 'Gulotty, Elle (DNR)'
Subject:	Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.
Categories:	Filed by Newforma

Good Morning Amira,

In looking through the comments you provided to UPPCO on the three year test period, UPPCO has a recommendation it would like to provide before it responds to your comments.

Under Silver Lake Storage Basin Comment 1, you stated the following:

> Adjustment of the start of month target elevation at the SLSB to the top of the spillway (1485.2 feet North American Vertical Datum 88) should be acceptable for the period following spring runoff (May, June, and July). UPPCO has proposed eliminating all start of the month targets without naming which months and without any conditions. The MDEQ recommends that either existing targets should be maintained or an alternative target should be proposed for May, June, and July. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season; and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 seasons, but the effects of the proposed operations on aquatic resources and the shoreline are still not fully understood.

UPPCO appreciates MDEQ taking the time to understand the need to store water at Silver Lake following spring runoff and understands the MDEQ need to name target elevations. UPPCO did not include start of month target elevations for the period following spring runoff through September 1 because the weather experienced during spring runoff and the summer months drives the storage needs at Silver Lake.

However, UPPCO will amend the three-year test period report to include start of month target elevations for May, June, and July of 1485.2 feet NAVD or 1485.04 feet NGVD. UPPCO agrees with the MDEQ and believes those target elevations will assist in operating the Dead River System as originally intended.

Under the MDEQ proposal, the target elevation for July 1 is 1485.04 feet NGVD and the target elevation for August 1 is 1480 feet NGVD. This would require UPPCO to strive to lower the Silver Lake Storage basin (releasing the majority of the stored water) starting July 2 approximately 5 feet to meet the start of month target elevation of 1480 feet NGVD by August 1.

In looking at the information on basin inflows provided by the Commission in the August 5, 2002 Final Environmental Assessment, Page 41 state the following:

Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station, USGS gaging station 04043800, located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[7] There are a few months of USGS data from the early

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[7] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited. The penstock was repaired by February 1998 and the stream restoration efforts were successful.

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Although the record is slight regarding annual average inflows into the Dead River Storage Basin, they are indicative of what UPPCO has experienced with average inflows dropping to near or less (considering evaporation) than the required 100 cfs minimum flow release from the Dead River Storage Basin for August and September.

That being said, under the current MDEQ proposal, most of the stored water would be required to be released in July, when stored water will be needed to augment flows into the Dead River Storage Basin during August and September also (depending upon weather).

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Please provide me your comments on this most-recent proposal.

Thank you.

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
Mead & Hunt | 1345B North Road | Green Bay, WI 54313
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MDNR January 3, 2018 request for a revised report

Shawn Puzen

From: Gulotty, Elle (DNR) <GulottyE@michigan.gov>
Sent: Wednesday, January 03, 2018 2:06 PM
To: Shawn Puzen; Oun, Amira (DEQ)
Cc: Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; Kruger, Kyle (DNR); Kohlhepp, Gary (DEQ); burr_fisher@fws.gov
Subject: RE: Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.

Categories: Filed by Newforma

Shawn,

On December 21, 2017 MDNR provided comments on UPPCO's October 24, 2017 report, attempting to incorporate changes UPPCO suggested through the course of consultation and discussion up to that point.

The revisions that occurred during consultation were mostly UPPCO dropping recommended changes to license conditions, but commenting was still difficult for MDNR due to the interdependence of license requirements and the scant information provided by the Test Period with respect to UPPCO's operations under the proposed conditions. It is even more difficult to comment on these matters piecemeal and on a rolling basis as is being requested today, especially without the benefit of the context which might be provided by UPPCO's responses to MDNR's comments.

If UPPCO wants agency comments on a new proposal, they should resubmit their Three Year Test Report to incorporate the suite of changes and recommendations UPPCO wants to carry forward. (Note, what UPPCO is referring to as MDEQ's proposal is actually UPPCO's proposal restated by MDEQ in their letter). Then agencies will have an opportunity to thoughtfully consider UPPCO's new proposal.

Thank you,
Elle

From: Shawn Puzen [mailto:Shawn.Puzen@meadhunt.com]
Sent: Wednesday, January 03, 2018 11:42 AM
To: Oun, Amira (DEQ)
Cc: Schlorke, Virgil E; Kenneth M. Carruthers; Joshua Ball; Katie Kern; Kruger, Kyle (DNR); Kohlhepp, Gary (DEQ); burr_fisher@fws.gov; Gulotty, Elle (DNR)
Subject: Clarification on your January 3, 2018 MDEQ comments on the three-year test period and a revised UPPCO proposal for your consideration.

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UPPCO appreciates MDEQ taking the time to understand the need to store water at Silver Lake following spring runoff and understands the MDEQ need to name target elevations. UPPCO did not include start of month target elevations for the period following spring runoff through September 1 because the weather experienced during spring runoff and the summer months drives the storage needs at Silver Lake.

However, UPPCO will amend the three-year test period report to include start of month target elevations for May, June, and July of 1485.2 feet NAVD or 1485.04 feet NGVD. UPPCO agrees with the MDEQ and believes those target elevations will assist in operating the Dead River System as originally intended.

Under the MDEQ proposal, the target elevation for July 1 is 1485.04 feet NGVD and the target elevation for August 1 is 1480 feet NGVD. This would require UPPCO to strive to lower the Silver Lake Storage basin (releasing the majority of the stored water) starting July 2 approximately 5 feet to meet the start of month target elevation of 1480 feet NGVD by August 1.

In looking at the information on basin inflows provided by the Commission in the August 5, 2002 Final Environmental Assessment, Page 41 state the following:

> Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station, USGS gaging station 04043800, located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[7] There are a few months of USGS data from the early
>
> [7] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited The penstock was repaired by February 1998 and the stream restoration efforts were successful.
>
> On or about October 22, 1990, there was a failure of a clay tile drainage pipe
>
> 41

Although the record is slight regarding annual average inflows into the Dead River Storage Basin, they are indicative of what UPPCO has experienced with average inflows dropping to near or less (considering evaporation) than the required 100 cfs minimum flow release from the Dead River Storage Basin for August and September.

That being said, under the current MDEQ proposal, most of the stored water would be required to be released in July, when stored water will be needed to augment flows into the Dead River Storage Basin during August and September also (depending upon weather).

Therefore, UPPCO proposes to set the Start of Month Targets as follows in the test period report to allow for Silver Lake Storage Basin to still provide storage and augment flows into the Dead River Storage Basin in August and September:
(the recommended changes from the MDEQ proposal are marked in red)
May 1485.04 feet NGVD
June 1485.04 feet NGVD
July 1485.04 feet NGVD
August 1483.2 feet NGVD
September 1481.4 feet NGVD
October 1479.5 feet NGVD

This will allow UPPCO to utilize approximately 1.8 feet of storage during the month of July, August, and September. If the weather at the time dictates otherwise, UPPCO will have to consult for a planned deviation.

Please provide me your comments on this most-recent proposal.

Thank you.

Shawn Puzen | FERC Licensing & Compliance Senior Project Manager
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UPPCO's January 4, 2018 revised report based upon a January 4, 2018 telephone conversation with MDEQ and MDNR request of January 4, 2018

Dead River Hydroelectric Project

Three Year Test Period – Test Year Four Final Annual Report (2016-2017)

Upper Peninsula Power Company

Test Year Four (2016-2017) Report Contents:

Attachments:

INTRODUCTION

Per the Article 405 "*Operations Monitoring Plan*" required by the License issued October 4, 2002, as amended January 24, 2006 and September 1, 2011, Upper Peninsula Power Company (UPPCO) is required to conduct a three-year test period on its Dead River Hydroelectric Developments. The test period is conducted to determine UPPCO's ability to comply with the provisions of Articles 402, and 403 of the License. Additionally, UPPCO shall provide copies of the annual report to the Federal Energy Regulatory Commission (FERC) within four (4) months of completion of a testing year[1].

In the Year Three Testing Report filed with the FERC on December 5, 2016, UPPCO proposed to conduct a fourth year of testing due to the unavailable storage in Silver Lake Storage Basin (SLSB) during the 2016 summer season. On January 31, 2017, the FERC approved the recommendation. Therefore, UPPCO is providing this report for the fourth year.

Prior to submittal of the report to FERC, UPPCO must provide copies to the Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), and the United States Fish and Wildlife Service (USFWS). The report must contain the following information:

- Hourly operations data for reservoir elevations and total plant flows at each development
- A description of any deviations from operational requirements
- A summary of any anomalies in operations
- A summary of the four (4) years of operations testing
- Recommendations to modify project operations to achieve compliance as necessary

HOURLY DATA FOR RESERVOIR HEADWATER ELEVATION AND TOTAL PLANT FLOWS

Hourly data for each testing year's operation of the Dead River Hydroelectric Project is provided as both a graphical representation, as well as given in tabular format provided in the attached table. The data is provided in terms of hourly headwater elevation data (ATTACHMENT A) and hourly total plant flow data (ATTACHMENT B). It should be noted that sharp" spikes" in the data typically portray a plant outage, which are reported as either

[1] "Testing Year" is the timeframe determined by the FERC upon UPPCO's fulfillment of the Silver Lake Storage Basin Refill Plan. This window has been declared as being annually August 5 to August 4 of the following year

individual planned or unplanned deviations (greater than 60 minutes), or they are provided in the annual deviations report (less than 60 minutes).

There are occurrences of missing data in the record. Each area of missing data has a note attached that indicates why the data is not presented. In most cases, data has been deliberately removed because it is obviously errant data where rapid changes in elevation are not physically possible. The errant data has been removed to provide for an accurate graphical display. However, during the period on or about February 14, 2017, data is missing because UPPCO was implementing its own independent operating system during this time-period and was separating itself from the operating system of its former parent company Integrys. Therefore, there were lapsed periods where data is not available.

Fulfillment of license requirements:

UPPCO filed its report titled "2016 Annual Report – Operation Monitoring & Report of Deviations Less Than Sixty Minutes" with FERC on February 28, 2017. The report outlines all deviations within the 2016 operating year, per Articles 402 and 403 of the License.

The 2016 operating year had three (3) deviations less than 60-minutes and five (5) deviations 60-minutes or greater. None of the deviations reported in the 2016 annual report were a result of UPPCO's inability to comply with requirements of the License. The figure below was provided as a table in the annual deviation report to FERC, and provides a summary of all deviations at each Development on the Dead River Project:

Figure 1. 2016 Dead River annual deviation summary

Deviations < 60 Minutes				
Project	Date	Length	Deviation	Reason
McClure	01/12/2016	14 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	11 Minutes	Minimum Flow	Unit trip due to packing adjustment
McClure	02/23/2016	16 Minutes	Minimum Flow	Unit trip due to continued packing adjustments

Deviations > 60 Minutes				
Project	Date	Length	Deviation	Reason

Hoist[2]	03/17/2016	1 Hr 11 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	03/17/2016	1 Hr 10 Mins	Minimum Flow	Local weather storm caused plant electrical fault
McClure	08/01/2016	16 days	Minimum Flow	Part 12 inspection and concrete repairs
Hoist	10/15/2016	1 Hr 43 Mins	Minimum Flow	Plant trip due to high winds
McClure	11/07/2016	1 Hr 50 Mins	Minimum Flow	Plant trip due to bearing cooling water line plug
Hoist	12/25/2016	2 Hr 7 Mins	Minimum Flow	Oil pump belt failure

UPPCO has observed and reported seven (7) deviations 60-minutes or greater within the 2017 operating year prior to August 5, 2017. Two of the deviations were planned

Deviations.
Five of the deviations were due to weather events. One of the planned deviations was conducted to allow UPPCO to meet the May start of month target elevation of 1341.0 feet NGVD at the Dead River Storage Basin (DRSB)[3]. Table 1 provides a summary of all deviations greater than 60 minutes in the 2017 operating year.

It should be noted, the SLSB was refilled and resumed normal operation on May 10, 2017.

Table 1. 2017 Summary of deviations greater than 60 minutes

Development	Date	Length	Deviation	Reason
Hoist	01/16/2017	14 days	Target Elevation	Hold Reservoir Constant for Ski Marathon
McClure	01/20/2017	1 Hr 30 Mins	Minimum Flow	Local weather storm caused plant electrical fault
Hoist	03/07/2017	1 Hr 12 Mins	Minimum Flow	Local weather storm caused plant electrical fault

[2] The Hoist Facility impounds the Dead River Storage Basin.
[3] The May start of month target of 1341.0 feet NGVD was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

Hoist	03/17/2017	21 days	Target Elevation	Planned deviation to achieve 1341.0 feet NGVD-May Start of Month Target
Hoist	04/10/2017	2 days and 12 Hrs	Minimum Flow	Local weather storm caused plant electrical fault
McClure	04/10/2017	> 1 day and < 1 day	Minimum Flow and Headwater	Local weather storm caused plant electrical fault
McClure	04/22/2017	19 days	Headwater	High Inflow due to weather

Deviations that are less than 60 minutes will be included in the 2017 annual report to be sent to the agencies for review and comment by the end of January.

MODIFICATIONS TO OPERATION THAT WERE IMPLEMENTED AS PART OF THE TEST PERIOD

UPPCO proposed several operational deviations in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 test reports. These were implemented to comply with the provisions of Articles 402, and 403 of the License. The provisions that were implemented and recommendations for future operations are listed by development as follows:

Silver Lake Storage Basin:

1. Adjustment of the start of month target elevation for May, June, and July at SLSB to the top of the spillway 1485.2 feet NAVD 88 or 1485.04 feet NGVD[4] was implemented. An adjustment of the May and June start of month target elevation was implemented in the 2014-2015 season and an adjustment of the June and July start of month target elevation was implemented in the 2015-2016 and 2016-2017 season.

Dead River Storage Basin:

1. A meeting in February or early March in 2014, 2015, 2016, and 2017 was arranged by UPPCO for consultation with the resource agencies (MDEQ, MDNR, and USFWS), and stakeholders (Dead River Campers Inc. (DRCI) and Keweenaw Bay Indian Community) to discuss UPPCO's suggestions to alter the DRSB operations prior to Spring runoff. This discussion included altering operations based on snowpack depth and water equivalency, as well as weather predictions.

2. An adjustment of the start of month target for the month of May was implemented in 2014, 2015, 2016, and 2017. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 or 1342.0 feet NGVD in 2014. The target was modified from 1340.0 feet NGVD to an elevation of 1341.0 feet NGVD in 2015 and 2017. In 2016, the target was modified to 1342.0 or 1343.0 feet NGVD because SLSB could not provide storage for the DRSB because it was in a drawn down state.

[4] The elevation of the top of the spillway was verified as 1485.20 feet NAVD-88 or 1485.04 feet NGVD during the 2017 dam safety inspection. Since the elevations are listed in the license in NGVD, an elevation of 1485.04 feet NGVD will be utilized.

3. UPPCO requested to eliminate the start of month target elevations for March and April for the 2017 season, but after consultation with the MDNR and MDEQ, it was believed to be premature and the request was withdrawn.

McClure Basin:

1. For the 2017 season, the maximum elevation of 1196.4 feet NGVD (spillway crest elevation) was eliminated.[5] This elevation proved difficult to attain when wave action or excess water due to storm events or runoff caused water to be spilled. In addition, Article 405 requires UPPCO to release flushing flows over the spillway. In 2017, UPPCO operated the McClure Storage Basin at or above 1194.8 feet NGVD, with no maximum reservoir elevation, while limiting fluctuations in elevation of not more than one (1) foot/day.

[5] Elimination of the maximum reservoir elevation at the McClure Basin was proposed in the Year Three Test Report submitted to the Commission on December 5, 2016.

SUMMARY OF FOUR YEARS OF OPERATIONS TESTING

Silver Lake Storage Basin:

1. Start of month targets

- If Spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- During the recreation season, the operation of the SLSB is based upon the water input needs to the DRSB.
- The water needs of the DRSB during most years, require the SLSB to provide storage after spring runoff and during the recreation season.
- The current start of month target elevations for the SLSB beginning at spring runoff and ending with the end of the summer recreation season will not allow for enough storage in the SLSB to maintain the start of month target elevations at the DRSB during the summer recreation season.
- It has been demonstrated through the test period, by adjusting the start of month target elevations at SLSB to 1485.04 feet NGVD (top of spillway) for June and July, it is beneficial to maintain the start of month elevations within the DRSB for the summer months by adjusting the start of month target elevations at SLSB to 1485.04 feet NGVD for June and July.
- It is difficult to determine the onset of spring runoff each year. In 2014, and 2015, spring runoff began in very early April[6]. In 2016[7] and 2017 spring runoff began in March.
- The April start of month target elevation influences operational decisions on flow releases in March (because striving to achieve a start of month target elevation is implemented in March) and consequently during the potential period when spring runoff can begin.
- In the summer of 2017, UPPCO was forced to release water from the SLSB to strive to meet the August start of month target elevation of 1480.0 while the DRSB was above its target of 1341.0.
- The start of month target elevations at the SLSB for the months of May through September need to be modified.

[6] The 2014 and 2015 runoff is determined by viewing the graph contained in Year One and Year Two Test Reports.
[7] Since the elevation of Silver Lake Storage Basin in 2016 was held low, the start of runoff for the area has been determined by looking at the flows for the USGS gage on the Middle Branch of the Escanaba River at Humboldt (USGS Gage No. 04057800).

- The start of month target elevations for November through March provide a benefit to limit reservoir fluctuations during freezing conditions to minimize impact upon hibernating reptiles.
- The monthly minimum elevations provide a benefit by assuring SLSB is not unduly impacted by drawdowns to meet the start of month target elevations at the DRSB.
- There is a need to maintain minimum flow releases from the SLSB even if the start of month target elevations or the minimum elevations cannot be maintained.
- The storage of colder water in the SLSB for release throughout the summer is believed to benefit water quality downstream during the early and late summer months.

Dead River Storage Basin:

1. Consultation

- Precipitation in the form of snow or rain (when it melts and how it melts) is a major driving factor in the operation of the Dead River System (primarily the SLSB and the DRSB).
- If proper decisions are not made in the winter prior to spring runoff, the start of month target elevations may not be met during the summer recreation season or the elevation of the DRSB can rise well above the target elevation during spring runoff.
- If spring runoff cannot be captured in the system, it is very difficult to meet the reservoir elevation requirements at the DRSB during the summer recreation season.
- Consultation with all stakeholders in February or early March is necessary for all stakeholders to understand the difficulty of predicting how and when spring runoff will occur. This reduces criticism by stakeholders during the summer recreation season.

2. May start of month target

- Spring runoff during the test period has occurred prior to the second part of April.
- If the start of month target for May is not increased to 1341.0 feet NGVD, spring runoff cannot be stored in the DRSB to its maximum potential for the summer recreation season.
- With a May start of month target of 1340.0 feet NGVD, UPPCO would be forced to release water downstream to drive the elevation down to the target of 1340.0 feet NGVD and the elevation would most-likely not recover during the remaining summer recreation season.

- UPPCO has never operated during the test period with an start of month target elevation of 1340.0 feet NGVD.

3. March and April start of month targets and minimums

- If there is not enough room in the DRSB to capture spring runoff, the reservoir elevation will rise rapidly until the spillway elevation is reached because maximum releases are limited until the elevation reaches the spillway.
- The nominal minimum spillway elevation is at an elevation of 1344.6 feet NGVD or approximately 3.5 feet above the start of month target elevations for the summer recreation season.
- UPPCO must take all reasonable steps to lower the impoundment to the target elevation.
- Some shoreline owners have filed concerns with FERC about reservoir elevations exceeding 1341.0 feet NGVD.
- Lowering the reservoir elevation from 1344.6 feet NGVD to 1341.0 feet NGVD can take weeks.
- Through consultation with stakeholders, in 2014, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of 1335.8 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1344.7 feet NGVD.
- Through consultation with stakeholders, in 2015, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were eliminated and the reservoir was drawn down to an elevation of approximately 1334.0 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1342.5 feet NGVD.
- In 2016, the March and April start of month target and minimum reservoir elevations of 1337.5 feet NGVD and 1337.0 feet NGVD were not deviated from because the SLSB was refilling from a drawdown for repairs the previous construction season. The DRSB was drawn down to a minimum elevation of 1337.9 feet NGVD before spring runoff. Before the summer recreation season, the reservoir rose to an elevation of 1343.2 feet NGVD.
- Through consultation with stakeholders, in 2017, fearing very little snowpack, and believing spring runoff would not occur in 2017, the start of month target elevation

for April 1 was changed to 1339.0 feet NGVD. The reservoir rose to an elevation of approximately 1345.1 feet NGVD in early May.

- The start of month target elevations and the minimum elevation requirements for the DRSB for March and April of each year are driven by the need to meet the start of month target elevations for the summer recreation season.
- During late February and early March, the operation of the DRSB is already dictated only by the need to achieve the start of month target elevations during the summer recreation season and guided by snowpack information.
- UPPCO has committed to conduct a meeting with stakeholders in February or early March. This commitment also renders the March and April elevation requirements unnecessary.

McClure Basin:

1. Maximum reservoir elevation

- Exceeding the maximum reservoir elevation at the McClure Dam causes water to flow over the spillway.

ANOMALIES IN OPERATION

2013-2014 Test Period

Spring runoff in 2014 was higher than expected and occurred prior to UPPCO being able to fully draw down the DRSB as planned. UPPCO began drawing down the DRSB to an elevation of 1335.0 feet NGVD, but was only able to reach a minimum elevation of 1335.8 feet NGVD prior to the onset of spring runoff. This resulted in a maximum spring reservoir elevation at the DRSB of 1344.7 feet NGVD. The DRSB remained above 1341.0 feet NGVD until June 19, 2014.

Under the Consent Judgment for the Dead River Recovery Effort with the Michigan Department of Environmental Quality, UPPCO released approximately 150 cfs from the low-level outlet at the SLSB for approximately 72 hours (May 2 to May 5, 2014), resulting in a maximum elevation of approximately 1484.5 feet NGVD on the last day of May. This activity had some, but minimal impact upon the ability of UPPCO to achieve a start of month target elevation of 1485.04 feet NGVD for the month of June at the SLSB.

During the months of July and August, 2014, the Hoist powerhouse was out of service and unable to complete planned maintenance work on the turbine leads and thrust bearings. During the period the units were out of service, flows were passed through the low-level outlet at the Hoist Dam. Approximately 100 to 105 cfs was passed during this time frame. The theoretical maximum capacity of the low-level outlet at a DRSB elevation of 1341.0 feet NGVD is approximately 125 cfs. During this time-period, the DRSB elevation was at or near 1341.0 feet NGVD.

2014-2015 Test Period

During the Spring of 2015 UPPCO initiated a planned deviation and planned drawdown of the SLSB to reach an elevation of 1476.0 feet NGVD to complete work on the dam. Drawdown of the SLSB took place just after the peak-runoff period until the anticipated construction start date of July 15, 2015. The SLSB would not refill again until May 10, 2017.

UPPCO also initiated a planned deviation prior to the planned drawdown to reduce the intensity of flows needed to draw SLSB down in the necessary timeframe necessary to meet construction deadlines. The planned deviation suggested lowering the June start of month target elevation for the SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD, and lowering

the June monthly minimum elevation at SLSB from 1480.5 feet NGVD to 1479.0 feet NGVD. UPPCO also suggested keeping the June start of month target elevation for the DRSB at 1342.0 feet NGVD, to allow for increased storage capacity during the upcoming summer months.

Due to an unexpected amount of heavy precipitation during the spring and early summer months, UPPCO was unable to fully reach the target elevation of 1479.0 feet NGVD at the SLSB as proposed in the planned deviation. UPPCO still initiated the drawdown of SLSB, and maintained compliance with the summer recreation elevation of 1341.0 feet NGVD by using the proposed 1342.0 feet NGVD at DRSB as a storage buffer. The maximum elevation reached in the DRSB for 2015 was 1342.9 feet NGVD on or about May 31, 2015.

2015-2016 Test Period

As stated previously, during the spring of 2015 UPPCO initiated a planned deviation and a planned drawdown of its SLSB to reach an elevation of 1476.0 feet NGVD. Drawdown of SLSB took place just after the peak-runoff period and occurred until the construction start date, July 15, 2015.

The data shows the effects of this drawdown in terms of both flows and elevations at SLSB for the remainder of 2015 and throughout 2016. In addition to limited reservoir elevations resulting from the drawdown, UPPCO was unable to release any flows above the required minimum monthly flows while it strived to refill the SLSB to 1485.04 feet NGVD per FERC Dam Safety requirements. Refill did not occur during the 2015-2016 Test Period.

Additionally, UPPCO had a period in 2015 where it entered dry year consultation with Stakeholders to attempt to meet license requirements. From late September to late December of 2015, UPPCO released reduced minimum flows. UPPCO returned the DRSB and the MB to normal operations on December 28, 2015 when the DRSB elevation was 1338.9 feet NGVD (December minimum elevation is 1338.5 feet NGVD and January start of month target is 1339.0 feet NGVD).

On March 22, 2016, UPPCO conducted a planned deviation at the DRSB, to avoid a potential inability to recover from the April start of month target elevation (1337.5 feet NGVD) and to maintain higher elevations at DRSB for the recreation season. UPPCO targeted elevation

1342.0 feet NGVD with proposed storage to 1343.0 feet NGVD. UPPCO continued this planned deviation until Labor Day. The maximum elevation reached at the DRSB during the planned deviation period in 2016 was approximately 1343.2 feet NGVD on April 29th.

The planned deviations resulting from the FERC Dam Safety Restrictions at the SLSB resulted in extending the three-year test period to the 2016-2017 season.

2016-2017 Test Period

On August 1, 2016, UPPCO conducted a planned deviation to curtail the required minimum flow release of 80 cfs from the MB for penstock inspection and concrete work and allow the MB elevation to exceed 1196.4 feet NGVD to pass water over the spillway and downstream. During that time-period, the maximum reservoir elevation for the MB was approximately 1196.6 feet NGVD on August 15, 2016. Normal operation resumed on August 16, 2016.

With the FERC Dam Safety restrictions at the SLSB, planned deviations were implemented during early 2017 to assure the DRSB could maintain its target elevation of 1341.0 feet NGVD during the summer recreation season. The following planned deviations were implemented:

- On March 6, 2017, at a DRSB elevation of approximately 1338.5 feet NGVD, UPPCO conducted a planned deviation to change the start of month target elevation for April from 1337.5 feet NGVD to 1338.5 feet NGVD. This was to preserve the water being stored, knowing the SLSB might not be available to provide additional storage for the DRSB during the summer recreation season.
- On Monday March 17, 2017, UPPCO modified the April start of month target elevation deviation from 1338.5 feet NGVD to 1339.0 feet NGVD. Normal operation of the DRSB resumed when the elevation rose above 1341.0 feet NGVD during early April. The maximum reservoir elevation for the DRSB of 1345.1 feet NGVD occurred in early May.

On May 10, 2017, the FERC Dam Safety restrictions were lifted for the SLSB and the it resumed normal operation.

RECOMMENDATIONS TO MODIFY PROJECT OPERATIONS TO ACHIEVE COMPLIANCE

Silver Lake Storage Basin:

In the simplest terms, the recommended changes below allow for UPPCO to fill the SLSB during spring runoff. Hold the water in the SLSB until it needs to be released to the DRSB to maintain the start of month target elevations and support water quality during the summer recreation season. The changes will allow for the intended operation of the Dead River Hydroelectric Project without restrictions that cannot adapt to the changing factors leading to spring runoff each year.

1. Modify the start of month targets as follows:
    a. May-1485.02 feet NGVD
    b. June-1485.02 feet NGVD
    c. July 1485.02 feet NGVD
    d. August 1483.2 feet NGVD
    e. September 1481.4 feet NGVD
2. Maintain target elevations for the remaining months as currently listed under Article 402 of the license.
3. During all months of the year, operate the SLSB above the monthly minimum reservoir elevations.
4. If SLSB elevations or target elevations cannot be maintained due to minimum flow requirements less than inflow, continue to release minimum flows.
5. At all times maintain the monthly minimum flows as required from the SLSB.

Dead River Storage Basin:

1. Schedule a meeting and invite stakeholders (MDNR, MDEQ, USFWS and DRCI) in February or early March to provide information on current elevations of both the SLSB and the DRSB. During the consultation, UPPCO will also provide snowpack and water equivalency information to try to predict the amount of spring runoff. UPPCO will also outline their plan for reservoir elevation management at the DRSB prior to spring runoff to accommodate the anticipated Spring runoff event.
2. Change the May start of month target elevation for the DRSB to 1341.0 feet NGVD.

McClure Basin:

1. No changes are recommended.

PROPOSED AMENDMENTS TO LICENSE CONDITIONS

The proposed amendments are outlined by facility or development in the recommendations to modify project operations to achieve compliance section above.

RECOMMENDATIONS FOR INCREASED MONITORING

UPPCO does not suggest any increased monitoring. UPPCO believes that current License monitoring requirements are sufficient to maintain compliance, therefore, no additional monitoring or reporting is being suggested in this report.

ATTACHMENT A- HOURLY HEADWATER ELEVATION DATA

ATTACHMENT B- HOURLY TOTAL PLANT FLOW DATA

January 9, 2018 MDNR comments on UPPCO's January 4, 2018 revised report

Shawn Puzen

From:	Gulotty, Elle (DNR) <GulottyE@michigan.gov>
Sent:	Tuesday, January 09, 2018 8:35 AM
To:	Shawn Puzen; Oun, Amira (DEQ); burr_fisher@fws.gov
Cc:	Katie Kern; Schlorke, Virgil E; Kenneth M. Carruthers; Kohlhepp, Gary (DEQ); Kruger, Kyle (DNR); jimgrundstrom@freichevy.com
Subject:	RE: Revised three-year test period final report for your comment-comments due EOB January 10, 2018.

Hi Shawn,

I want to make sure I understand one facet of the the updated proposal.

For Silver Lake Storage Basin, can you explain the maximum change (amount and over what time) in elevations that you'd expect to occur outside of the spring runoff capture period? Specifically, if the minimums are held at the levels in the existing certification/license, and the targets are raised to the spillway, will there be circumstances where the reservoir is allowed to fluctuate more than the 1.5 feet or so which approximates the difference between target elevations and minimum elevations in the current license?

Similarly, is it correct that the runoff capture period would represent a relatively fast, substantial, filling of the basin once per year, with a gradual drawdown to meet recreation targets downstream, and that there would not be circumstances where the system would be operated (drawn down again) to capture, say a multi-week summer storm or similar event?

Thank you,

Elle

UPPCO response to January 9, 2018 MDNR comments on UPPCO's January 4, 2018 revised report

Shawn Puzen

From:	Shawn Puzen
Sent:	Tuesday, January 09, 2018 11:54 AM
To:	'Gulotty, Elle (DNR)'; Oun, Amira (DEQ); burr_fisher@fws.gov
Cc:	Katie Kern; Schlorke, Virgil E; Kenneth M. Carruthers; Kohlhepp, Gary (DEQ); Kruger, Kyle (DNR); jimgrundstrom@freichevy.com
Subject:	RE: Revised three-year test period final report for your comment-comments due EOB January 10, 2018.
Categories:	Filed by Newforma

Hi Elle,
Thank you for asking for this clarification. I think it is best to address your concerns one at a time. UPPCO responses are in Green.

Please note: the responses do not require modifications to the recommendations included in the revised draft provided to you for comment on January 4, 2018. UPPCO will need to correct the SLSB spillway elevation in the revised draft to read 1485.04 feet NGVD throughout the document.

For Silver Lake Storage Basin, can you explain the maximum change (amount and over what time) in elevations that you'd expect to occur outside of the spring runoff capture period?

Long Answer:
Under the report sent to you on January 4, 2018, (revised report), during spring runoff, UPPCO would target the top of the spillway at 1485.04 feet NGVD (revised report mistakenly said 1485.02 was the top of spillway). The purpose is to meet the Start of Month Target for May (May 1). UPPCO will continue to target the top of the spillway through the month of May, through the month of June, until July 1.

During the month of May (after spring runoff) the elevation will be held at approximately 1485.04 until July 1. According to Article 402 requires UPPCO to "strive to operate the existing project facilities to achieve the start of month target elevations..." Therefore, UPPCO has to target the top of the spillway May 1 to July if the start of month target elevations for May, June, and July are changed to the top of the spillway.

After July 1, in looking at the inflows that occur during that year, water will need to be withdrawn from SLSB Lake to keep the DRSB at its start of month targets August 1 through November 1 of 1341.0. The extra inflow of water from SLSB to DRSB is necessary to maintain the minimum flow releases of 100 cfs from DRSB during mid to late summer because evaporation in the DRSB is higher and inflows to the DRSB are near or below 100 cfs. Therefore, targets needed to be established for August and September to meet the October start of month target of 1479.5. UPPCO recommended in the revised report the reduction of target elevation over a three-month time period (July, August, and September). The August 1 start of month target elevation was recommended to be 1483.2 feet (reduction of 1.84 feet in July). The September 1 start of month target elevation was recommended to be 1481.4 feet (reduction of 1.8 feet in August). The October 1 start of month target elevation is currently 1479.5 and recommended to be the same (reduction of 1.9 feet in September). The major reductions in elevation will occur prior to herptile hibernation for the year.

Short Answer:
During May there will be very little fluctuation after the SLSB is filled to the top of the spillway. Increased inflows in addition to what UPPCO is releasing through the low-level outlet may cause the elevation to rise above the spillway to release increased inflows (a 0.2 foot rise above the spillway releases approximately 50 cfs).

During June there will be very little fluctuation after the SLSB is filled to the top of the spillway. Increased inflows in addition to what UPPCO is releasing through the low-level outlet may cause the elevation to rise above the spillway to release increased inflows (a 0.2 foot rise above the spillway releases approximately 50 cfs).
During July, the reservoir will be reduced from targeting 1485.04 to targeting 1483.2 feet by August 1 (1.84 foot reduction).
During August, the reservoir will be reduced from targeting 1483.2 to targeting 1481.4 feet by September 1 (1.8 foot reduction).
During September, the reservoir will be reduced from targeting 1481.4 to targeting 1479.5 feet by October 1 (1.9 foot reduction).

Specifically, if the minimums are held at the levels in the existing certification/license, and the targets are raised to the spillway, will there be circumstances where the reservoir is allowed to fluctuate more than the 1.5 feet or so which approximates the difference between target elevations and minimum elevations in the current license?

Long Answer:
Ordering paragraph (C) of the Order Modifying and Approving Article 405 Operations Monitoring Plan dated March 11, 2010, prohibits UPPCO from intentionally creating circumstances where the reservoir is allowed to fluctuate more than 1.5 feet or so. This is because paragraph C of the Order states: "after the start of the month, the licensee shall operate the reservoirs in an effort to move toward the next start of month target elevation." The minimum elevations are used to initiate the dry-year consultation process when actions beyond UPPCO's control cause the reservoir to drop to the minimum level (i.e. inflows are less than the required minimum flow releases and the reservoir elevation is lowered)." Paragraph (E) of the March 11, 2010 Order states: "If reservoir inflow is insufficient to maintain minimum reservoir elevation requirements at any of the project developments, the licensee shall implement the dry year consultation process.....The licensee shall begin the dry-year consultation process no later than the first business day following the day when the reservoir decreases below the required minimum elevation due to low inflow conditions."

Short Answer:
No, not while the operation is under the control of UPPCO.

Similarly, is it correct that the runoff capture period would represent a relatively fast, substantial, filling of the basin once per year, with a gradual drawdown to meet recreation targets downstream, and that there would not be circumstances where the system would be operated (drawn down again) to capture, say a multi-week summer storm or similar event?

Long Answer:
The SLSB reservoir fills rather quickly during spring runoff. The water is stored at SLSB until mid to late summer when it needs to be released to the DRSB to meet the downstream recreation targets at DRSB. Operation that is NOT in an "effort to move toward the next start of month target elevation" is prohibited by paragraph (C) of the March 11, 2010 Order (drawing down when the next monthly target is NOT a lower elevation). UPPCO cannot draw down in anticipation of a storm during under its recommended target elevations at SLSB for May, June, and July without undergoing the planned deviation process in consultation with the stakeholders.

Short Answer:
Correct, the runoff period is generally a relatively fast, substantial filling of the reservoir once per year, with a gradual drawdown. Drawing down again to capture a multi-week summer storm or similar event is prohibited without UPPCO initiating the process for a planned deviation.

Please feel free to call me with questions.

Thanks!

January 10, 2018 MDNR comments on UPPCO's January 4, 2018 revised report

Shawn Puzen

From: Gulotty, Elle (DNR) <GulottyE@michigan.gov>
Sent: Wednesday, January 10, 2018 1:41 PM
To: Shawn Puzen; Oun, Amira (DEQ); burr_fisher@fws.gov
Cc: Katie Kern; Schlorke, Virgil E; Kenneth M. Carruthers; Kohlhepp, Gary (DEQ); Kruger, Kyle (DNR); jimgrundstrom@freichevy.com
Subject: RE: Revised three-year test period final report for your comment-comments due EOB January 10, 2018.

Shawn,

A few additional areas of concern came to mind that I do not think I have articulated yet. If I clearly have missed something, please bring it to my attention.

This summer, and I believe rather frequently in the recent past, the elevation at Hoist has been substantially higher than the targets for extended periods (whether meeting the monthly targets or not).

I am interested in whether UPPCO expects the frequency or duration of deviations where Hoist is above its targets to change (increase) under the scenario UPPCO has proposed for operations. As I understand it, there are implications for high water as well as low water elevations at Hoist for resource users and landowners, and that from a fisheries standpoint we are additionally concerned about the impact of elevation fluctuations during important spawning and recruitment periods, as well as due to concerns about erosion.

If it is the case that Hoist is above the target and additional inflows are expected, can you please describe how the elevation at Hoist would be managed (and note if different based on the new proposal). Please describe when the LLO systems would be used to alleviate elevation exceedances at the impoundments.

I am also interested in UPPCO reiterating the order of priorities for operations as far as elevation, minimum flow, etc.

Will there be circumstances foreseeable under the proposed scenario where Hoist will play an emphasized role for storage?

If UPPCO's recommended elevations were adopted, what would happen if Silver lake doesn't come close to meeting the target elevations following spring runoff?
Alternatively, what would happen if Silver lake stores that additional flow earlier than expected?

Separately, who is the author of the "quick facts" which were distributed to Amira and George and I?

Thank you,

Elle

UPPCO response to January 10, 2018 MDNR comments on UPPCO's January 4, 2018 revised report

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, January 11, 2018 8:03 AM
To:	'Gulotty, Elle (DNR)'; Oun, Amira (DEQ); burr_fisher@fws.gov
Cc:	Katie Kern; Schlorke, Virgil E; Kenneth M. Carruthers; Kohlhepp, Gary (DEQ); Kruger, Kyle (DNR); jimgrundstrom@freichevy.com; Joshua Ball
Subject:	RE: Revised three-year test period final report for your comment-comments due EOB January 10, 2018.
Categories:	Filed by Newforma

Hi Elle,

Thanks for asking the questions.

Comment:
This summer, and I believe rather frequently in the recent past, the elevation at Hoist has been substantially higher than the targets for extended periods (whether meeting the monthly targets or not).

I am interested in whether UPPCO expects the frequency or duration of deviations where Hoist is above its targets to change (increase) under the scenario UPPCO has proposed for operations. As I understand it, there are implications for high water as well as low water elevations at Hoist for resource users and landowners, and that from a fisheries standpoint we are additionally concerned about the impact of elevation fluctuations during important spawning and recruitment periods, as well as due to concerns about erosion.

UPPCO Response:
Based upon the Hydraulic model, the recommendations contained in the January 4, 2018 revised report are not expected to increase the frequency or durations of exceedances of the required targets at DRSB (Hoist). Please remember, SLSB provides less than 20% of the inflow into the DRSB. The revised report recommends target elevations at SLSB that are expected to augment inflows to DRSB and help maintain the DRSB target elevation when total inflows to the DRSB plus evaporation become less than the required 100 cfs minimum flow release from the DRSB.

The report also recommends a meeting of the stakeholders prior to spring runoff. During this meeting, the amount of drawdown in anticipation of spring runoff to avoid raising the DRSB significantly above the summer recreation target is decided. The pre-spring runoff actions at DRSB are the most important actions to avoid raising the DRSB significantly above the summer recreation target.

Comment:
If it is the case that Hoist is above the target and additional inflows are expected, can you please describe how the elevation at Hoist would be managed (and note if different based on the new proposal). Please describe when the LLO systems would be used to alleviate elevation exceedances at the impoundments.

UPPCO Response:
The DRSB elevations above target are most impacted by the pre-spring runoff actions at DRSB. Since the SLSB provides less than 20% of the inflow into the DRSB and the major changes are recommended at SLSB, the recommended changes are not expected to increase the frequency or durations of exceedances of the required targets at DRSB. Therefore, the use of the LLO system at DRSB is not required or expected to change as a result of the recommended changes.

Comment:

I am also interested in UPPCO reiterating the order of priorities for operations as far as elevation, minimum flow, etc.

UPPCO Response:
First priority: maintain minimum flow releases (as recommended in the test report)
Second priority: Target elevations
Third priority: Minimum reservoir elevations (as recommended in the test report)

When elevations approach minimum elevations, dry-year consultation occurs to determine next actions.

Comment:
Will there be circumstances foreseeable under the proposed scenario where Hoist will play an emphasized role for storage?

UPPCO Response:
The need to provide extra storage at the DRSB prior to spring runoff is required to avoid raising the DRSB significantly above the summer recreation targets.

Comment:
If UPPCO's recommended elevations were adopted, what would happen if Silver lake doesn't come close to meeting the target elevations following spring runoff?
Alternatively, what would happen if Silver lake stores that additional flow earlier than expected?

UPPCO Response:
If a start of month target is not met, the license requires UPPCO to strive toward the start of month target for the following month. For example, is the SLSB elevation rises to 1484.5 during spring runoff in the month of May, UPPCO is required to continue to release no more than minimum flows until the SLSB elevation rises to 1485.04 feet (the start of month target for June). If the SLSB does not rise to the target of 1485.04 feet by June, UPPCO is required to continue to release no more than minimum flows until the SLSB elevation rises to 1485.04 feet (the start of month target for July). After July 1, UPPCO is required to make releases to strive to meet the August start of month target for August 1 (UPPCO recommends an August start of month target of 1483.2).

If spring runoff arrives prior to April 1 and it appears the April start of month target of 1477.5, UPPCO will either have to increase releases to lower SLSB elevation to the target by April 1 or consult on a planned deviation to keep the spring runoff stored in SLSB until it begins to increase releases to meet the August start of month target elevation.

Comment:
Separately, who is the author of the "quick facts" which were distributed to Amira and George and I?

UPPCO Response:
You will have to talk to Ken or Virgil separately about the author(s).

Thanks!
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THE U.S. FISH AND WILDLIFE SERVICE (FWS) DID NOT RESPOND WITH COMMENTS

Document Content(s)