



**Upper Peninsula Power Company**  
1002 Harbor Hills Drive  
Marquette, MI 49855  
[www.UPPCO.com](http://www.UPPCO.com)

August 7, 2015

FERC Project No. 2506  
NATDAM No. 00167

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street NE  
Washington, DC 20426

Dear Secretary Bose:

**Escanaba River Hydroelectric Project – Boney Falls Development**  
**Notice of Potential Deviation – Escanaba River Hydroelectric Project Water Quality Monitoring**

Per the Order Modifying and Approving the Water Quality Monitoring Plan under Article 415, dated March 9, 2005, Upper Peninsula Power Company (UPPCO) is conducting water quality monitoring at the following locations within the Escanaba River Hydroelectric Project:

- In the tailrace of Escanaba Boney Falls (Dam #4), approximately 600 feet downstream of the powerhouse
  - The dissolved oxygen standard for Boney Falls (Dam #4) is: 7.0 mg/L
  - The water quality monitoring equipment has a manufacturer-rated accuracy of  $\pm 0.1$  mg/L. Given this information, readings below 6.9 mg/L at Boney Falls (Dam #4) are potential deviations from the D.O. standard
- Additionally, UPPCO attempts to operate Boney Falls (Dam #4) at temperatures specified by the Michigan Coldwater Stream Standard.
  - The standard for the month of July is: 68°F

Monitoring is completed in accordance with the Water Quality Monitoring Plan. Monitoring is conducted annually during the months of July and August. For the month of July, the equipment is cleaned, calibrated, and the data downloaded on a weekly basis. For August, equipment is cleaned, calibrated, and the data downloaded on a bi-weekly basis. All data is collated continuously in one-hour intervals.

After collection, a post calibration of the monitoring equipment is conducted to determine calibration drift. Raw dissolved oxygen (D.O.) data is adjusted assuming a linear degradation of the calibration based upon the post calibration of the equipment.

During the period of July 20 at 13:00 EST through July 27 10:00 EST (when equipment maintenance occurred), dissolved oxygen readings below 7.0 mg/l were observed daily except for the morning of July 27. After verifying and correcting (as necessary) the monitoring data for calibration drift, the lowest D.O. concentration observed was 6.3 mg/l. The likely cause of the low D.O. levels observed is warm water temperatures. Daily average water temperatures during this time period were above 71°F, with daily maximum temperatures reaching 75°F.

During the monitoring period, flow augmentation was initiated on July 20, 21, 22, and 25. Flow augmentation is initiated in an attempt to mitigate warm water temperatures in the Escanaba River downstream of the powerhouse. As part of the procedure, when

Ms. Kimberly D. Bose, Secretary  
August 7, 2015  
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augmentation is initiated, flow from the powerhouse is increased to 150 percent of the base flow between 11:00 EST and 18:00 EST; the flow is then reduced to 75 percent of the base flow to allow the reservoir to refill.

With the exception of a seven-hour period on July 24, 2015, dissolved oxygen corrective action occurred as required by the approved plan<sup>1</sup> daily between July 23 and July 27. On July 24, there was a seven hour period where dissolved oxygen levels were below 7.0 mg/l and the facility was not conducting flow augmentation or D.O. corrective action.

On July 23, flow augmentation was initiated to mitigate warm water temperatures downstream of the facility. When the augmentation period was initiated, the alarm for low dissolved oxygen was suppressed. Upon completion of the augmentation period, shortly after midnight on July 24, operators failed to re-activate the dissolved oxygen alarm and therefore did not realize, D.O. levels were below 7.0 mg/l. During shift change at 7:00 EST on July 24 the low D.O. levels were identified and D.O. corrective action was initiated. During this seven hour time period, D.O. levels varied between 6.8 and 6.9 mg/l.

Due to this event the procedure for Augmentation was reviewed and adjustments have been made that require the review of the D.O. alarm and documenting its status on the augmentation record. This will ensure that if the alarm was suppressed do to the augmentation event that it is re-activated at the completion of augmentation.

UPPCO provided notice of the low D.O. readings to the Michigan Department of Natural Resources (MDNR), Michigan Department of Environmental Quality (MDEQ), and the U.S. Fish and Wildlife Service (FWS) by e-mail on July 28. Documentation of agency consultation is attached. If you have any questions regarding this letter, please contact Bob Meyers at (906) 485-2419 or Jarrod Nelson at (906) 232-1433.

Sincerely,



Virgil Schlorke  
Director - Energy Supply & Resource Planning

MWM/rjf

Enc: 20150728 Agency Notification

cc: Mr. James Melchiori, UPPCO - UVD      Mr. David Tripp, UPPCO - UISC  
Mr. Robert Meyers, UPPCO - UISC      Mr. John Zygaj, FERC - CRO  
Mr. Keith Moyle, UPPCO - UISC      Mr. John Myers, IBS - D2  
Mr. Jarrod Nelson, UPPCO - UISC

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<sup>1</sup> The approved plan requires corrective action when real time monitoring indicates dissolved oxygen levels were less than 7.0 mg/l downstream of the powerhouse. Flow augmentation is a corrective action and when the facility is not augmenting flow, corrective action is initiated by releasing aeration flow through a spillway gate.

**Metcalf, Mark W**

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**From:** Metcalf, Mark W  
**Sent:** Tuesday, July 28, 2015 4:00 PM  
**To:** 'Gary Kohlhepp'; 'Diana Klemans'; 'Carpenter, Koren'; 'Kruger, Kyle'; 'Burr Fisher'  
**Cc:** Meyers, Robert J; Schlorke, Virgil E; Nelson, Jarrod F  
**Subject:** Water quality monitoring - Escanaba Dam 4, July 20 to July 27 2015  
**Attachments:** Dam 4 data July 2015.pdf

Good afternoon,

Pursuant to the Order Approving Modifications to Dissolved Oxygen Monitoring Plan Under Articles 415, dated March 9, 2005, UPPCO is conducting water quality monitoring downstream of Escanaba 4 in calendar year 2015. As described in the water quality monitoring plan, UPPCO is monitoring dissolved oxygen and temperature in the Escanaba River downstream of the powerhouse continuously during the months of July and August, with monitoring data being collected at one-hour intervals. The dissolved oxygen standard at Dam 4 (Boney Falls) is 7.0 mg/l. Please note that the water quality monitoring equipment has an accuracy of +/- 0.1 mg/l, per the manufacturer. Therefore, readings below 6.9 mg/l at Dam 4 are potential deviations from the dissolved oxygen water quality standard. As described in the monitoring plan, raw DO data is adjusted assuming a linear degradation of calibration based upon a post calibration of the monitoring equipment.

During the period of July 20 at 13:00 EST through July 27 at 10:00 EST (when equipment maintenance occurred), hourly readings below 7.0 mg/l were observed. The lowest DO concentration observed during this time period was 6.4 mg/l. The likely cause of the low DO levels observed are warm water temperatures. Daily average water temperatures during this time period were above 71°F, with daily maximum temperatures reaching 75°F.

Flow augmentation was initiated on July 20, 21, 22, and 25. Flow augmentation is initiated in an attempt to mitigate warm water temperatures in the Escanaba River downstream of the powerhouse. As part of the procedure, when augmentation is initiated, flow from the powerhouse is increased to 150% of the base flow between 11:00 and 18:00 EST, then reduced to 75% of the base flow to allow the reservoir to refill.

Dissolved oxygen corrective action occurred daily between July 23 and July 27. When low dissolved oxygen levels are observed and the facility is not augmenting flow or in isolation mode, aeration flow was released through a gate. Please note that on July 24, there was a seven hour period where dissolved oxygen levels were below 7.0 mg/l when flow augmentation or DO corrective action was not occurring. On July 23, flow augmentation was initiated to mitigate warm water temperatures downstream of the facility. When the augmentation period was initiated, the alarm for low dissolved oxygen was suppressed. During the augmentation event, the water elevation in the reservoir actually increased due to increasing river flow during the augmentation period. As a result of increasing river flow, the reservoir refilled to pre-augmentation levels shortly after midnight on July 24. Upon completion of the augmentation period, DO levels were below 7.0 mg/l, however; operators did not recognize that the dissolved oxygen alarm was suppressed until shortly after 7:00 EST when DO corrective action was initiated. During this seven hour time period, DO levels varied between 6.8 and 6.9 mg/l.

Attached for your review is the dissolved oxygen and temperature monitoring data collected to date. Please feel free to contact me if you have questions.

Mark

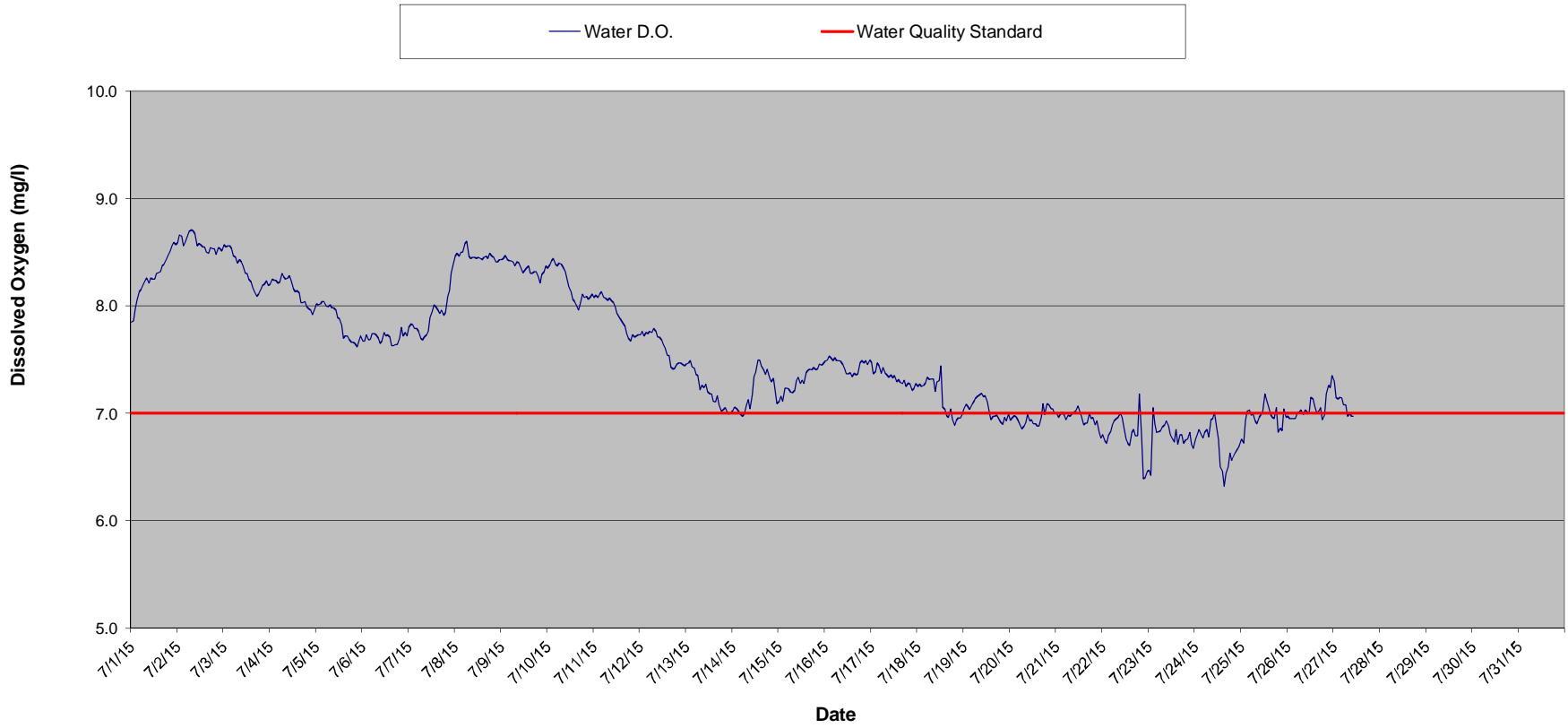
**Mark Metcalf**

Environmental Consultant – Air & Water

office: 920-433-1833

mobile: 920-606-8432

### Escanaba Dam 4 Dissolved Oxygen Summary - July 2015



Escanaba Dam 4 - July 2015 Dissolved Oxygen Monitoring Data

Time HHMMSS	07/01/15	07/02/15	07/03/15	07/04/15	07/05/15	07/06/15	07/07/15	07/08/15	07/09/15	07/10/15	07/11/15	07/12/15	07/13/15	07/14/15	07/15/15	07/16/15
0	7.9	8.6	8.6	8.2	8.0	7.7	7.8	8.5	8.4	8.4	8.1	7.7	7.5	7.0	7.1	7.5
10000	7.9	8.7	8.6	8.3	8.0	7.7	7.8	8.5	8.4	8.4	8.1	7.8	7.5	7.1	7.2	7.5
20000	8.0	8.7	8.6	8.2	8.0	7.7	7.8	8.5	8.5	8.4	8.1	7.7	7.5	7.0	7.1	7.5
30000	8.1	8.6	8.6	8.2	8.0	7.7	7.8	8.5	8.4	8.4	8.1	7.8	7.4	7.0	7.2	7.5
40000	8.1	8.6	8.5	8.2	8.0	7.7	7.8	8.5	8.4	8.4	8.1	7.7	7.4	7.0	7.2	7.5
50000	8.2	8.7	8.5	8.2	8.0	7.7	7.8	8.6	8.4	8.4	8.1	7.8	7.4	7.0	7.2	7.5
60000	8.2	8.7	8.5	8.3	8.0	7.7	7.7	8.6	8.4	8.4	8.1	7.8	7.4	7.0	7.2	7.5
70000	8.2	8.7	8.4	8.3	8.0	7.7	7.7	8.5	8.4	8.4	8.1	7.8	7.2	7.1	7.2	7.5
80000	8.3	8.7	8.4	8.3	8.0	7.7	7.7	8.4	8.4	8.4	8.1	7.8	7.3	7.1	7.2	7.5
90000	8.2	8.7	8.4	8.3	8.0	7.7	7.7	8.5	8.4	8.3	8.1	7.7	7.2	7.0	7.3	7.5
100000	8.3	8.6	8.4	8.3	8.0	7.7	7.8	8.5	8.4	8.3	8.0	7.7	7.3	7.2	7.3	7.4
110000	8.3	8.6	8.3	8.2	7.9	7.8	7.9	8.4	8.3	8.2	8.0	7.7	7.2	7.3	7.3	7.4
120000	8.3	8.6	8.3	8.2	7.9	7.7	8.0	8.5	8.3	8.1	7.9	7.6	7.2	7.4	7.3	7.4
130000	8.3	8.6	8.3	8.1	7.8	7.7	8.0	8.4	8.4	8.1	7.9	7.6	7.2	7.5	7.3	7.4
140000	8.3	8.6	8.2	8.1	7.7	7.7	8.0	8.4	8.4	8.0	7.9	7.5	7.1	7.5	7.4	7.3
150000	8.3	8.5	8.2	8.1	7.7	7.6	8.0	8.5	8.3	8.0	7.8	7.5	7.1	7.4	7.4	7.4
160000	8.4	8.5	8.1	8.0	7.7	7.6	7.9	8.5	8.3	8.0	7.8	7.4	7.2	7.4	7.4	7.4
170000	8.4	8.5	8.1	8.0	7.7	7.6	8.0	8.4	8.3	8.0	7.7	7.4	7.1	7.4	7.4	7.4
180000	8.4	8.5	8.1	8.0	7.7	7.6	7.9	8.5	8.3	8.1	7.7	7.4	7.0	7.4	7.4	7.5
190000	8.5	8.5	8.2	8.0	7.7	7.7	7.9	8.5	8.3	8.1	7.7	7.5	7.0	7.3	7.4	7.5
200000	8.5	8.5	8.2	8.0	7.7	7.8	8.1	8.5	8.2	8.1	7.7	7.5	7.1	7.3	7.4	7.5
210000	8.6	8.5	8.2	8.0	7.6	7.7	8.1	8.4	8.3	8.1	7.7	7.5	7.0	7.3	7.5	7.5
220000	8.6	8.5	8.2	7.9	7.7	7.8	8.3	8.4	8.3	8.1	7.7	7.5	7.0	7.2	7.4	7.5
230000	8.6	8.5	8.2	8.0	7.7	7.7	8.4	8.4	8.4	8.1	7.7	7.4	7.0	7.1	7.5	7.5
Daily Max	8.6	8.7	8.6	8.3	8.0	7.8	8.4	8.6	8.5	8.4	8.1	7.8	7.5	7.5	7.5	7.5
Daily Min	7.9	8.5	8.1	7.9	7.6	7.6	7.7	8.4	8.2	8.0	7.7	7.4	7.0	7.0	7.1	7.3
Average	8.3	8.6	8.3	8.1	7.9	7.7	7.9	8.5	8.4	8.2	7.9	7.6	7.2	7.2	7.3	7.4

License Minimum Dissolved Oxygen: 7.0 mg/l

Augmentation Event

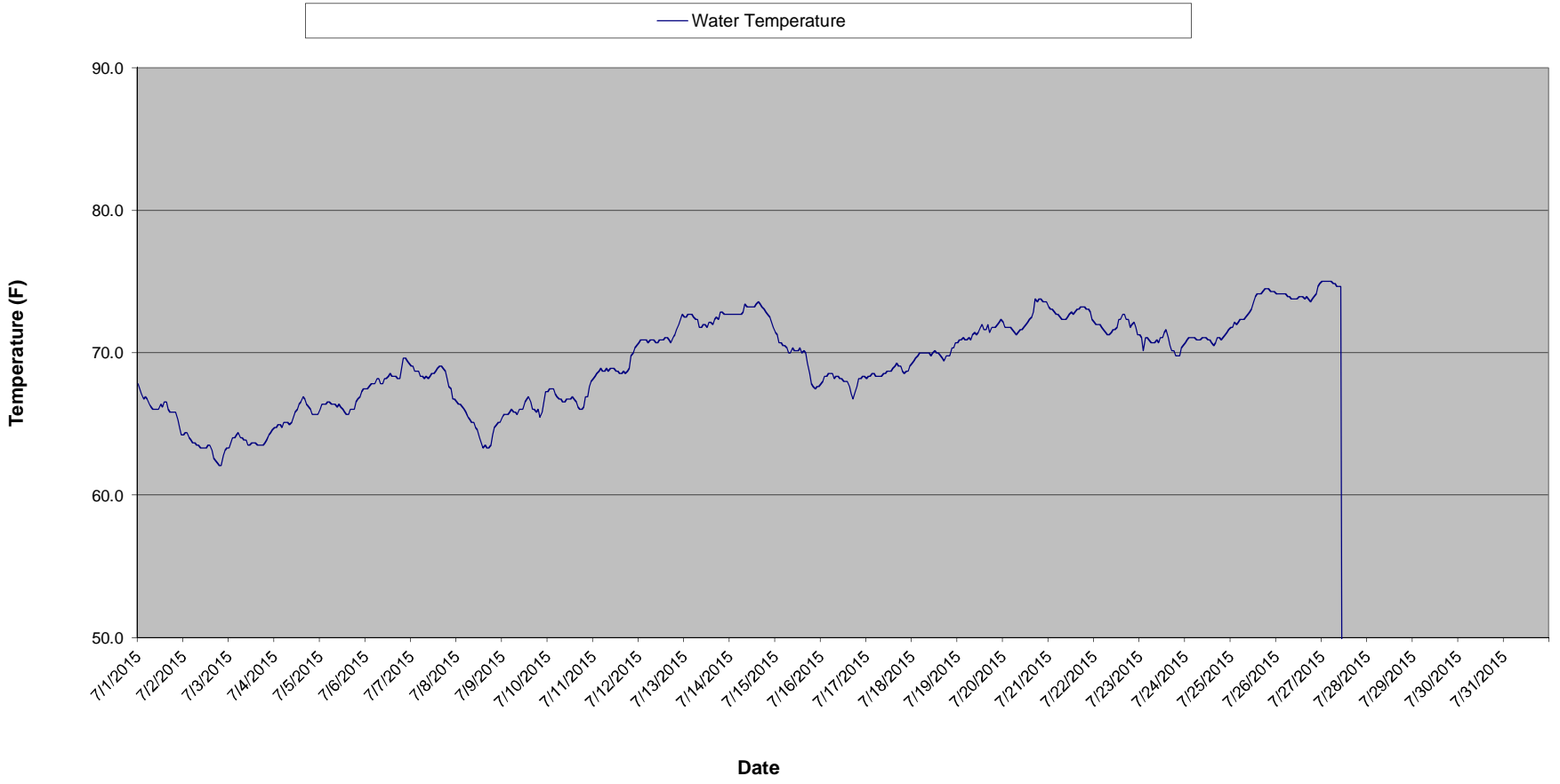
DO corrective action occurring. Water being released through spillway gate.

Escanaba Dam 4 - July 2015 Dissolved Oxygen Monitoring Data

Time HHMMSS	07/17/15	07/18/15	07/19/15	07/20/15	07/21/15	07/22/15	07/23/15	07/24/15	07/25/15	07/26/15	07/27/15	07/28/15	07/29/15	07/30/15	07/31/15
0	7.5	7.2	7.0	6.9	7.0	6.8	6.5	6.8	6.8	7.0	7.3	0.0	0.0	0.0	0.0
10000	7.4	7.3	7.1	7.0	7.0	6.7	6.4	6.8	6.7	7.0	7.2	0.0	0.0	0.0	0.0
20000	7.4	7.3	7.1	7.0	7.0	6.7	7.1	6.9	6.9	7.0	7.1	0.0	0.0	0.0	0.0
30000	7.5	7.3	7.0	7.0	7.0	6.8	6.9	6.8	7.0	7.0	7.2	0.0	0.0	0.0	0.0
40000	7.4	7.3	7.1	6.9	7.0	6.8	6.8	6.8	7.0	7.0	7.1	0.0	0.0	0.0	0.0
50000	7.4	7.3	7.1	6.9	6.9	6.9	6.8	6.8	7.0	7.0	7.1	0.0	0.0	0.0	0.0
60000	7.4	7.3	7.1	6.9	7.0	6.9	6.8	6.9	7.0	7.0	7.1	0.0	0.0	0.0	0.0
70000	7.4	7.3	7.2	6.9	7.0	7.0	6.9	6.8	6.9	7.0	7.0	0.0	0.0	0.0	0.0
80000	7.4	7.3	7.2	6.9	7.0	7.0	6.9	6.9	6.9	7.0	7.0	0.0	0.0	0.0	0.0
90000	7.3	7.2	7.2	7.0	7.0	7.0	6.9	7.0	7.0	7.0	7.0	0.0	0.0	0.0	0.0
100000	7.4	7.3	7.2	6.9	7.0	7.0	6.9	7.0	7.0	7.0	7.0	0.0	0.0	0.0	0.0
110000	7.3	7.3	7.2	6.9	7.1	6.9	6.8	6.9	7.0	7.0	0.0	0.0	0.0	0.0	0.0
120000	7.4	7.4	7.1	6.9	7.0	6.8	6.8	6.8	7.2	7.2	0.0	0.0	0.0	0.0	0.0
130000	7.3	7.1	7.0	6.9	7.0	6.7	6.7	6.5	7.1	7.1	0.0	0.0	0.0	0.0	0.0
140000	7.3	7.0	6.9	6.9	6.9	6.7	6.9	6.5	7.1	7.1	0.0	0.0	0.0	0.0	0.0
150000	7.3	7.0	7.0	6.9	6.9	6.8	6.7	6.3	7.0	7.0	0.0	0.0	0.0	0.0	0.0
160000	7.3	7.0	7.0	7.0	6.9	6.9	6.8	6.4	7.0	7.0	0.0	0.0	0.0	0.0	0.0
170000	7.3	7.0	7.0	7.1	7.0	6.8	6.8	6.5	7.0	7.1	0.0	0.0	0.0	0.0	0.0
180000	7.2	6.9	6.9	7.0	7.0	6.8	6.7	6.6	7.1	6.9	0.0	0.0	0.0	0.0	0.0
190000	7.3	6.9	6.9	7.1	7.0	7.2	6.8	6.6	6.8	7.0	0.0	0.0	0.0	0.0	0.0
200000	7.3	6.9	6.9	7.1	6.9	6.8	6.8	6.6	6.9	7.2	0.0	0.0	0.0	0.0	0.0
210000	7.2	7.0	7.0	7.0	6.9	6.4	6.8	6.6	6.8	7.3	0.0	0.0	0.0	0.0	0.0
220000	7.2	7.0	6.9	7.0	6.8	6.4	6.7	6.7	7.0	7.2	0.0	0.0	0.0	0.0	0.0
230000	7.3	7.0	7.0	7.0	6.8	6.5	6.7	6.7	7.0	7.4	0.0	0.0	0.0	0.0	0.0
Daily Max	7.5	7.4	7.2	7.1	7.1	7.2	7.1	7.0	7.2	7.4	7.3	0.0	0.0	0.0	0.0
Daily Min	7.2	6.9	6.9	6.9	6.8	6.4	6.4	6.3	6.7	6.9	0.0	0.0	0.0	0.0	0.0
Average	7.3	7.1	7.0	7.0	7.0	6.8	6.8	6.7	7.0	7.1	3.2	0.0	0.0	0.0	0.0

Augmentation Event  
 DO corrective action occurring. Water being released through spillway gate.  
 No DO corrective action or flow augmentation occurring.  
 Note: DO values of zero indicate data has not been collected yet.

### Escanaba Dam 4 Water Temperature - July 2015







Escanaba Dam 4 - July 2015 Temperature Monitoring Data

HHMMSS	07/01/15	07/02/15	07/03/15	07/04/15	07/05/15	07/06/15	07/07/15	07/08/15	07/09/15	07/10/15	07/11/15	07/12/15	07/13/15	07/14/15	07/15/15	07/16/15
0	68	64	63	65	66	67	69	67	65	67	68	71	73	73	71	68
10000	67	64	64	65	66	67	69	66	66	67	68	71	73	73	71	68
20000	67	64	64	65	66	68	69	66	66	67	69	71	73	73	71	68
30000	67	64	64	65	66	68	69	66	66	67	69	71	73	73	71	68
40000	67	64	64	65	67	68	69	66	66	67	69	71	73	73	71	69
50000	67	64	64	65	67	68	68	66	66	67	69	71	73	73	71	69
60000	66	64	64	65	66	68	68	65	66	67	69	71	72	73	70	69
70000	66	64	64	65	66	68	68	65	66	67	69	71	72	73	70	68
80000	66	64	64	65	66	68	68	65	66	67	69	71	72	73	70	68
90000	66	63	64	65	66	68	68	65	66	67	69	71	72	73	70	68
100000	66	63	64	65	66	68	68	65	66	67	69	71	72	73	70	68
110000	66	63	64	66	66	68	69	65	66	67	69	71	72	73	70	68
120000	66	63	64	66	66	68	69	64	67	67	69	71	72	73	70	68
130000	66	64	64	66	66	69	69	64	67	67	69	71	72	73	70	68
140000	67	64	64	67	66	68	69	63	67	67	69	71	72	73	70	68
150000	67	63	64	67	66	68	69	64	67	67	69	71	72	74	70	68
160000	66	63	64	67	66	68	69	63	66	66	69	71	72	73	70	67
170000	66	62	64	66	66	68	69	63	66	66	69	71	73	73	69	67
180000	66	62	64	66	66	68	69	64	66	66	69	71	72	73	69	67
190000	66	62	64	66	67	69	68	64	66	66	69	71	73	73	68	68
200000	66	62	64	66	67	70	68	65	65	67	70	72	73	73	68	68
210000	65	63	64	66	67	70	67	65	66	67	70	72	73	73	67	68
220000	65	63	64	66	67	69	67	65	67	68	70	72	73	72	68	68
230000	64	63	65	66	67	69	67	65	67	68	71	73	73	72	68	68
Daily Max	68	64	65	67	67	70	69	67	67	68	71	73	73	74	71	69
Daily Min	64	62	63	65	66	67	67	63	65	66	68	71	72	72	67	67
Average	66	63	64	66	66	68	68	65	66	67	69	71	72	73	70	68

Monthly average temp (F): 64

 Augmentation Event  
 DO corrective action occurring. Water being released through spillway gate.

Escanaba Dam 4 - July 2015 Temperature Monitoring Data

HHMMSS	07/17/15	07/18/15	07/19/15	07/20/15	07/21/15	07/22/15	07/23/15	07/24/15	07/25/15	07/26/15	07/27/15	07/28/15	07/29/15	07/30/15	07/31/15
0	68	69	71	72	73	72	71	71	72	74	75	32	32	32	32
10000	68	69	71	72	73	72	71	71	72	74	75	32	32	32	32
20000	68	70	71	72	73	72	70	71	72	74	75	32	32	32	32
30000	69	70	71	72	73	72	71	71	72	74	75	32	32	32	32
40000	69	70	71	72	73	72	71	71	72	74	75	32	32	32	32
50000	68	70	71	72	73	72	71	71	72	74	75	32	32	32	32
60000	68	70	71	71	73	71	71	71	72	74	75	32	32	32	32
70000	68	70	71	71	72	71	71	71	72	74	75	32	32	32	32
80000	68	70	71	71	72	71	71	71	73	74	75	32	32	32	32
90000	69	70	71	72	72	71	71	71	73	74	75	32	32	32	32
100000	69	70	71	72	73	72	71	71	73	74	75	32	32	32	32
110000	69	70	71	72	73	72	71	71	73	74	32	32	32	32	32
120000	69	70	72	72	73	72	71	71	74	74	32	32	32	32	32
130000	69	70	72	72	73	72	71	71	74	74	32	32	32	32	32
140000	69	70	72	72	73	72	72	71	74	74	32	32	32	32	32
150000	69	70	72	73	73	73	71	71	74	74	32	32	32	32	32
160000	69	70	72	73	73	73	71	71	74	74	32	32	32	32	32
170000	69	69	71	74	73	72	70	71	74	74	32	32	32	32	32
180000	69	70	72	74	73	72	70	71	74	74	32	32	32	32	32
190000	69	70	72	74	73	72	70	71	74	74	32	32	32	32	32
200000	69	70	72	74	73	72	70	71	74	74	32	32	32	32	32
210000	69	70	72	74	73	72	70	71	74	74	32	32	32	32	32
220000	69	70	72	74	73	72	70	71	74	75	32	32	32	32	32
230000	69	71	72	74	72	71	71	72	74	75	32	32	32	32	32
Daily Max	69	71	72	74	73	73	72	72	74	75	75	32	32	32	32
Daily Min	68	69	71	71	72	71	70	71	72	74	32	32	32	32	32
Average	69	70	71	72	73	72	71	71	73	74	52	32	32	32	32

Augmentation Event  
 DO corrective action occurring. Water being released through spillway gate.  
 Note: readings of 32 degrees indicates data has not been collected yet.

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