



ORIGINAL

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FEDERAL ENERGY
REGULATORY COMMISSION

FERC Project No. 2595

073

February 10, 2003

Ms. Magalie Roman Salas, Secretary
Federal Energy Regulatory Commission
Mail Code: DTCA, HL 21.3
888 First Street, N.E.
Washington, DC 20426

Dear Secretary Salas:

High Falls Hydroelectric Project 2002 Dissolved Oxygen Monitoring Report

As per the Order Amending the Water Quality Monitoring Plans for the High Falls Hydroelectric Project (FERC Project No. 2595) dated April 30, 2002, Wisconsin Public Service Corporation (WPSC) is providing this report of the 2002 Water Quality Monitoring Activities. The main purpose of the report, per the amended monitoring plan, is to provide instances when the dissolved oxygen levels in the tailwater of the projects fell below the standards outlined in the approved plan.

The High Falls project had dissolved oxygen readings in compliance with the Dissolved Oxygen standard 99.6% percent of the time last year. Due to the protocol and mitigation options, WPSC was able to alleviate sustained periods of dissolved oxygen levels below the standards for the 2002 monitoring season.

The High Falls Hydroelectric Project experienced levels of dissolved oxygen below the standard for short durations as outlined in Appendix 1. The data records in Appendix 1 indicate periods when the dissolved oxygen concentration fell below the standard. In all instances, when the readings were continuously below the standard, the appropriate mitigation measures were imposed.

The entire monitoring record with calibration records for the 2002 monitoring season was provided to the Wisconsin Department of Natural Resources (WDNR) and the Fish and Wildlife Service (FWS) (Appendix 2 and Appendix 4). Appendix 2 contains hard copies of the calibration records. All data that was artificially inflated or deflated due to calibration errors or instrumentation drift greater than 0.2 Mg/L has been adjusted through post calibration data.

The following mitigation measures were implemented during the 2002 season:

High Falls

June 30, 2002

Taintor gate was raised to provide an aeration flow. Agency personnel not notified because level was not yet in a non-compliant condition (<4.8 Mg/L) before mitigation measures were initiated.

July 26, 2002

Instrument calibration was verified and the taintor gate aeration flow was increased. Agency personnel notified.

In reviewing the data, WPSC identified time periods where the maximum pH limit of 9.0 was exceeded. All of the high readings occurred during the following monitoring periods:

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June 28 through July 8, 2002
July 26 through August 5, 2002
August 23 through August 30, 2002

Since there has been no prior history of pH deviations at the project, WPSC investigated the pH data for validity. In comparing the calibration records included in Appendix 2 with the 2002 pH monitoring data, WPSC has determined, the readings were due to an intermittent error associated with the same monitoring device (Datasonde #36466). Therefore, WPSC has determined the pH deviations are invalid and not an accurate representation of the quality of the water being released from the High Falls Hydroelectric Project. The error was not detected during calibration because of its intermittent nature. Datasonde #36466 will be returned to the manufacturer for repair, prior to returning it to service in the 2003 monitoring season.

For 2002 monitoring season, the High Falls Hydroelectric Project was in compliance with the water quality requirements as outlined in the Order Amending Water Quality Monitoring Plans issued on April 30, 2002.

In June of 2000, the High Falls Hydroelectric Project experienced large diurnal fluctuations of dissolved oxygen. In an effort to minimize the large fluctuations, WPSC implemented a partial drawdown in the winter of 2001-2002 for the control of Eurasian watermilfoil. Enclosed in Appendix 3 are graphs depicting the diurnal fluctuations experienced in June 2000, 2001, and 2002. There is a visible difference between June 2000 and 2001, but very little visible difference between June 2001 and 2002. Therefore, although the partial drawdown was successful in minimizing the population of Eurasian watermilfoil, it appears as though it made little improvement upon the diurnal fluctuations of dissolved oxygen normally experienced in June of each year.

WPSC provided copies of the annual report to the WDNR and the FWS for a 30-day comment period. The WDNR responded satisfactorily and the FWS did not respond within the 30-day comment period (See Appendix 4).

Should you have any questions regarding this material, please do not hesitate to call Shawn Puzen at (920) 433-1094. Thank you for your time and consideration.

Sincerely,



David W. Harpole
Vice President - Energy Supply
Telephone: (920) 433-1264

Enc.

cc: Mr. Greg Egtvedt - WPSC - A2
Mr. Gil Snyder - WPSC - D2
Mr. Dennis Maki, WPSC - WES
Mr. Bill Bloczynski, WPSC - MERH
Mr. Thomas Meronek, WDNR
Ms. Janet Smith, FWS
Ms. Peggy Harding, FERC Chicago

Appendix 1

Periods Below Standard of 4.8 Mg/L

<u>Project</u>	<u>Date</u>	<u>Start Time</u>	<u>Maximum Duration (hours)</u>
High Falls	07/25/02	23:00	9.0
	07/26/02	14:00	1.0

Appendix 2

Calibration Data Sheets

Monitoring Data

Field Notes for Datasonde Deployment

Date/Time: May 28, 2002 11:00 Analyst: JP

Location: High Falls Datasonde Serial #: 364660

Calibration Information Datasonde Battery (volts): 6.3V (New)

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	<u>6.61</u>	<u>7.00</u>
10.00 Std	<u>10.11</u>	<u>10.00</u>

Conductivity (mS/cm)	Before Cal.	After Cal.	Zero Conductivity Calibration
<u>0.288</u> Std	<u>0.288</u>	<u>0.288</u>	Before <u>0.000</u> After <u>0.000</u>

Barometric Pressure (mm Hg) 29.12" Hg, 740 mm Hg

Dissolved Oxygen	Before Calibration	After Calibration
% Saturation	<u>115.1%</u>	<u>100.0%</u>
mg/L D.O.	<u>9.30 mg/L</u>	<u>7.99 mg/L</u>
Temp - °C	<u>25.28°C</u>	<u>25.42</u>

YSI calibration (See field notes for YSI Model 95 MEA calibration information)

	Before Calibration	After Calibration
% Saturation	<u>91.0%</u>	<u>97.0%</u>
mg/L D.O.	<u>7.33 mg/L</u>	<u>7.85 mg/L</u>
Temp - °C	<u>26.1°C</u>	<u>26.1°C</u>

New memb. on 5/08/02

Test Program Readings

	Datasonde	YSI Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	_____	_____	
mg/L D.O.	_____	_____	
Temp - °C	_____	_____	

Re-calibration required if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	YSI
% Saturation	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
mg/L D.O.	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
Temp - °C	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>

YSI Reading at Tube

Time	_____
% Saturation	_____
mg/L D.O.	_____
Temp - °C	_____

Check Status

Battery Life @ Start: _____
Battery Life @ End: _____

Notes: Setup to test real time monitoring.
Data will not be reported.

Field Notes for Datasonde Deployment

Date/Time: May 31, 2002 13:50 Analyst: TH

Location: High Falls Bridge Datasonde Serial #: 36465

Calibration Information Datasonde Battery [volts]: 6.3V New

pH (s.u.)	Before Cal.	After Cal.	} New ph ref. solution
7.00 Std	<u>7.82</u>	<u>7.00</u>	
10.00 Std	<u>6.0</u>	<u>10.00</u>	

Conductivity (mS/cm)	Before Cal.	After Cal.	Zero Conductivity Calibration
<u>0.288</u> Std	<u>0.281</u>	<u>0.288</u>	Before <u>0.0000</u> After <u>0.0000</u>

Barometric Pressure (mm Hg) 732 mm Hg

Dissolved Oxygen	Before Calibration	After Calibration
% Saturation	<u>83.2%</u>	<u>100.0%</u>
mg/L D.O.	<u>7.56 mg/L</u>	<u>7.90 mg/L</u>
Temp - °C	<u>25.29°C</u>	<u>25.33°C</u>

YSI calibration (See field notes for YSI Model 95 55 calibration information)

	Before Calibration	After Calibration	Cal. elev. @ 8
% Saturation	<u>93.7%</u>	<u>97.2%</u>	
mg/L D.O.	<u>7.58 mg/L</u>	<u>7.84 mg/L</u>	
Temp - °C	<u>26.3</u>	<u>26.3</u>	

Test Program Readings

	Datasonde	YSI Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	<u>94.6%</u>	<u>95.2%</u>	
mg/L D.O.	<u>8.75 mg/L</u>	<u>9.13 mg/L</u>	
Temp - °C	<u>17.31°C</u>	<u>17.4°C</u>	

Re-calibration required if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	YSI
% Saturation	<u>93.7%</u>	<u>97.2%</u>	<u>94.6%</u>	<u>95.2%</u>
mg/L D.O.	<u>7.58 mg/L</u>	<u>7.84 mg/L</u>	<u>8.75 mg/L</u>	<u>9.13 mg/L</u>
Temp - °C	<u>26.3</u>	<u>26.3</u>	<u>17.31°C</u>	<u>17.4°C</u>

YSI Reading at Tube

Time	<u>14:30</u>
% Saturation	<u>93.0%</u>
mg/L D.O.	<u>9.08 mg/L</u>
Temp - °C	<u>16.4°C</u>

Check Status

Battery Life @ Start: _____
 Battery Life @ End: _____

Notes: Sunny and nice, 80°, D.O. Cal.
performed w/ cond. solution, check
depth of datasonde outside bottom
of tube

TTY Mode

Field Notes for Datasonde Post Calibration

Date/Time: May 31, 2002 14:15 Analyst: HR

Location: High Falls Bridge Datasonde Serial #: 360466

Ending Datasonde Battery [volts]: 6.3

Calibration Information

pH (s.u.)	Reads	<u>Zero Cond. Reads</u> <u>0.0000</u>
7.00 Std	<u>6.42</u>	
10.00 Std	<u>9.59</u>	

Conductivity (mS/cm) 0.288 Std 0.273 Reads

Barometric Pressure (mm Hg) 732 mm Hg

Dissolved Oxygen	before cal	after cal
% Saturation	<u>85.7%</u>	<u>100.1%</u>
mg/L D.O.	<u>7.20 mg/L</u>	<u>8.28 mg/L</u>
Temp - °C	<u>22.68°C</u>	<u>22.95°C</u>

YSI calibration (See field notes for _____ for calibration info.)

% Saturation	<u>X</u>
mg/L D.O.	<u>X</u>
Temp - °C	<u>X</u>

Notes:

setup for D.O. Calibration with tap
water Download file named HF053102.txt
and calibrated D.O.

Field Notes for Datasonde Post Calibration

Date/Time: June 10, 2002 13:20 Analyst: HA

Location: High Falls Bridge Datasonde Serial #: 36465

Ending Datasonde Battery [volts]: 5.4V

Calibration Information

pH (s.u.)	Reads
7.00 Std	<u>6.79</u>
10.00 Std	<u>9.77</u>

Zero Cond. Reads
zero → 0.0000

Conductivity (mS/cm) 0.288 Std 0.284 Reads

Barometric Pressure (mm Hg) 732 mm Hg

Dissolved Oxygen	before cal	after cal
% Saturation	<u>100.0%</u>	<u>100.0%</u>
mg/L D.O.	<u>7.68 mg/L</u>	<u>7.67 mg/L</u>
Temp - °C	<u>26.93°C</u>	<u>26.27.04</u>

YSI calibration (See field notes for _____ for calibration info.)

% Saturation	<u>X</u>
mg/L D.O.	<u>X</u>
Temp - °C	<u>X</u>

Notes:

setup for D.O. Calibration with tap water. Download file HF00102002.txt

Circulator tested fine.

Field Notes for Datasonde Deployment

Date/Time: June 10, 2002 13:00 Analyst: FR

Location: High Falls Bridge Datasonde Serial #: 36467

Calibration Information Datasonde Battery [volts]: 6.3V

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	<u>6.99</u>	<u>7.00</u>
10.00 Std	<u>9.71</u>	<u>10.00</u>

Conductivity (mS/cm)	Before Cal.	After Cal.	Zero Conductivity Calibration
<u>0.288</u> Std	<u>0.277</u>	<u>0.288</u>	Before <u>0.0000</u> After <u>0.0000</u>

Barometric Pressure (mm Hg) 732 mm Hg

Dissolved Oxygen	Before Calibration	After Calibration
% Saturation	<u>100.0%</u>	<u>100.0%</u>
mg/L D.O.	<u>9.33 mg/L</u>	<u>7.67 mg/L</u>
Temp - °C	<u>26.80°C</u>	<u>26.85°C</u>

YSI calibration (See field notes for YSI Model 95 MEA calibration information)

% Saturation	Before Calibration	After Calibration
mg/L D.O.	<u>95.0%</u>	<u>97.0%</u>
Temp - °C	<u>7.02 mg/L</u>	<u>7.11 mg/L</u>
	<u>31.4°C</u>	<u>31.4°C</u>

New cap memb. on 5/25/02

Test Program Readings

% Saturation	Datasonde	YSI Meter	(Must be within 0.5 mg/L D.O.)
mg/L D.O.	<u>69.3%</u>	<u>76.3%</u>	
Temp - °C	<u>6.36 mg/L</u>	<u>7.23 mg/L</u>	
	<u>17.69°C</u>	<u>17.8°C</u>	

Recall D.O. only

Re-calibration required if outside 0.5 mg/l limit

% Saturation	Before Cal.	After Cal.	Datasonde	YSI
mg/L D.O.	<u>95.4%</u>	<u>100.0</u>	<u>71.5%</u>	<u>75.7%</u>
Temp - °C	<u>7.30 mg/L</u>	<u>7.66</u>	<u>6.52 mg/L</u>	<u>7.20 mg/L</u>
	<u>17.0</u>	<u>17.0</u>	<u>17.98°C</u>	<u>17.8°C</u>

Deploy (2nd Datasonde) (had bubble)

YSI Reading at Tube

Time	<u>14:15</u>
% Saturation	<u>95.0%</u>
mg/L D.O.	<u>7.20 mg/L</u>
Temp - °C	<u>17.8°C</u>

Check Status

Battery Life @ Start:	<u>100%</u>	<u>OK</u>
Battery Life @ End:	<u>72%</u>	

Notes: partly cloudy, light wind, 80°F
TTY made, water too deep, flow too fast to make out to tube and check distance tube is off bottom of river.

Field Notes for Datasonde Deployment

Date/Time: 6/20/02 Analyst: MLM
Location: High Falls Bridge Datasonde Serial #: 36465

Calibration Information Datasonde Battery [volts]: 6.3

pH (s.u.) Before Cal. After Cal.
7.00 Std 7.17 7.00
10.00 Std 10.05 10.01

Conductivity (mS/cm) Before Cal. After Cal. Zero Conductivity Calibration
0.288 Std 0.285 0.288 Before .0000 After .0000

Barometric Pressure (mm Hg) 737.5

Dissolved Oxygen Before Calibration After Calibration
% Saturation 100.5 100.1
mg/L D.O. 8.16 8.19
Temp - °C 23.84 23.83

YSI calibration (See field notes for YSI Model 55 calibration information)

Before Calibration After Calibration
% Saturation 74.0 71.1
mg/L D.O. 7.89 8.14
Temp - °C 24.2 24.2

Test Program Readings
Datasonde YSI Meter (Must be within 0.5 mg/L D.O.) Final #'s
% Saturation 76.1 76.0 67.1
mg/L D.O. 6.90 7.11 6.05
Temp - °C 18.59 18.7 18.54

Re-calibration required if outside 0.5 mg/l limit
Before Cal. After Cal. Datasonde YSI
% Saturation _____
mg/L D.O. _____
Temp - °C _____

YSI Reading at Tube Time 9:00
% Saturation 73.0
mg/L D.O. 6.82
Temp - °C 18.6
Check Status
Battery Life @ Start: _____
Battery Life @ End: _____

Notes: Check Status = OK
Circulator - ON + TTY Mode
High Falls Test 6/20: HFT 620.txt
Download: HF 620.txt
Nothing < 5.7

Field Notes for Datasonde Post Calibration

Date/Time: 6/20/02 Analyst: MLM

Location: Nigh Falls Bldg Datasonde Serial #: 36467

Ending Datasonde Battery [volts]: 5.4

Calibration Information

pH (s.u.)	Reads
7.00 Std	<u>7.08</u>
10.00 Std	<u>10.10</u>

Conductivity (mS/cm) 0.288 Std 0.293 Reads

Barometric Pressure (mm Hg) 738

Dissolved Oxygen	before cal	after cal
% Saturation	<u>92.6</u>	<u>100.0</u>
mg/L D.O.	<u>7.46</u>	<u>8.11</u>
Temp - °C	<u>24.27</u>	<u>24.34</u>

YSI calibration (See field notes for _____ for calibration info.)

% Saturation	_____
mg/L D.O.	_____
Temp - °C	_____

Notes:

HF 620.txt - OK

OK

Field Notes for Datasonde Deployment

Date/Time: June 28, 2002 1:30 Analyst: JD

Location: High Falls Bridge Datasonde Serial #: 36466

Calibration Information Datasonde Battery [volts]: 6.1 V

pH (s.u.)	Before Cal.	After Cal.	New ph ref sol. on 6/27/02
7.00 Std	<u>6.48</u>	<u>7.00</u>	
10.00 Std	<u>10.07</u>	<u>10.00</u>	

Conductivity (mS/cm)	Before Cal.	After Cal.	Zero Conductivity Calibration
<u>0.288</u> Std	<u>0.285</u>	<u>0.288</u>	Before <u>0.000</u> After <u>0.000</u>

Barometric Pressure (mm Hg) 28.97 mmHg, 736 mmHg

Dissolved Oxygen	Before Calibration	After Calibration
% Saturation	<u>98.7%</u>	<u>100.0%</u>
mg/L D.O.	<u>7.66 mg/L</u>	<u>7.78 mg/L</u>
Temp - °C	<u>26.43°C</u>	<u>26.50°C</u>

YSI calibration (See field notes for YSI Model 55 calibration information)

	Before Calibration	After Calibration	New memb. on 6/27/02 Cal. elev. @ 8
% Saturation	<u>84.6%</u>	<u>97.1%</u>	
mg/L D.O.	<u>6.61 mg/L</u>	<u>7.56 mg/L</u>	
Temp - °C	<u>28.3°C</u>	<u>28.3°C</u>	

Test Program Readings

	Datasonde	YSI Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	<u>72.7%</u>	<u>73.5%</u>	
mg/L D.O.	<u>6.04 mg/L</u>	<u>6.32 mg/L</u>	
Temp - °C	<u>23.0°C</u>	<u>23.0°C</u>	

Re-calibration required if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	YSI
% Saturation	_____	_____	_____	_____
mg/L D.O.	_____	_____	_____	_____
Temp - °C	_____	_____	_____	_____

YSI Reading at Tube 14:00

Time	<u>14:00</u>
% Saturation	<u>70.4%</u>
mg/L D.O.	<u>6.11 mg/L</u>
Temp - °C	<u>29.5°C</u>

Check Status

Battery Life @ Start:	<u>100%</u>	OK
Battery Life @ End:	<u>28%</u>	

Notes: Partly sunny, light winds, 86°F
Test file named HFT628.txt

Field Notes for Datasonde Post Calibration

Date/Time: June 28, 2002 13:45 Analyst: JP

Location: High Falls Bridge Datasonde Serial #: 36465

Ending Datasonde Battery [volts]: 6.3V

Calibration Information

pH (s.u.)	Reads
7.00 Std	<u>7.20</u>
10.00 Std	<u>10.18</u>

Zero Cond. Reads
0.0000

Conductivity (mS/cm) 0.288 Std 0.274 Reads

Barometric Pressure (mm Hg) 28.97" Hg, 736 mm Hg

Dissolved Oxygen	before cal	after cal
% Saturation	<u>96.8%</u>	<u>100.0%</u>
mg/L D.O.	<u>7.48 mg/L</u>	<u>7.67 mg/L</u>
Temp - °C	<u>27.19°C</u>	<u>27.28°C</u>

YSI calibration (See field notes for _____ for calibration info.)

% Saturation	<u>X</u>
mg/L D.O.	<u>X</u>
Temp - °C	<u>X</u>

Notes:

Setup for D.O. Calibration w/ tap
water, download file named HF062802.txt
Then cal. D.O. and other parameters
low value is 5.56 mg/L @ 65.5% on 73.08 6/27/02
Check circulator, makes noise
but does not spin.

Field Notes for Datasonde Post Calibration

Date/Time: July 8, 2002 12:48 Analyst: JA

Location: High Falls Bridge Datasonde Serial #: 36466

Ending Datasonde Battery [volts]: 6.1V

Calibration Information

pH (s.u.)	Reads
7.00 Std	<u>7.14</u>
10.00 Std	<u>10.24</u>

Zero Cond. Reads
0.0000

Conductivity (mS/cm) 0.288 Std 0.286 Reads

Barometric Pressure (mm Hg) 29.09" Hg, 739 mm Hg

Dissolved Oxygen	before cal	after cal
% Saturation	<u>90.3%</u>	<u>100.0%</u>
mg/L D.O.	<u>7.13 mg/L</u>	<u>7.91 mg/L</u>
Temp - °C	<u>25.71°C</u>	<u>25.80°C</u>

YSI calibration (See field notes for _____ for calibration info.)

% Saturation	<u> </u>
mg/L D.O.	<u> </u>
Temp - °C	<u> </u>

Notes:

Setup for D.O. Calibration with tap
water Download file named HF070802.txt
Then read other parameters. Low
D.O. value is 4.98 mg/L @ 1300 on 6/30/02
open gate, spill water D.O.
went up.