Draft Report

2011 Water Quality Monitoring Data
(Per License Article 401 WQC, Condition K)

For the

Clam River Hydroelectric Project
FERC Project # 9185
Flambeau Hydro, LLC

Clam River
Burnett County, WI

Respectfully Submitted by:

North American Hydro Holdings
116 North State Street
Neshkoro, Wisconsin 54960

Draft – October 10, 2011

Table of Contents

Summary

2011 marked the fourth year of water quality sampling under the FERC License issued on July 24, 2006 to Flambeau Hydro, LLC for the Clam River Hydroelectric Project – FERC Project # 9185 and specifically Appendix A Section 401 K.

Ice-Out occurred on the Clam River during the 2nd full week of April 2011. The Ice-Out sampling event occurred on April 27, 2011. River flow, based on Clam River Hydroelectric Project records, was approximately 400 cubic feet per second. Sampling occurred between 10:00 a.m. and 10:37 a.m. Samples were taken without incident. No unusual D.O. or Temperature readings were observed. Samples for laboratory analysis were delivered to Northern Lake Service, Inc in Crandon, WI on April 28, 2011. Northern Lake Service, Inc. issued a laboratory report on May 2, 2011. No unusual levels of Chlorophyll a, True Color, or Total Phosphorus were noted in the laboratory reports.

River flow, based on Clam River Hydroelectric Project records, was approximately 271 cubic feet per second during the July 13, 2011 sampling event. Sampling occurred between 1:50 p.m. and 2:25 p.m. Samples were taken without incident. No unusual D.O. or Temperature readings were observed. Samples for laboratory analysis were delivered to Northern Lake Service, Inc in Crandon, WI on July 14, 2011. Northern Lake Service, Inc. issued a laboratory report on July 22, 2011. No unusual levels of True Color, or Total Phosphorus were noted in the laboratory reports. However, the Chlorophyll a result of 62 seems higher than normal but can probably be attributed to large algae blooms occurring at this time of year.

River flow, based on Clam River Hydroelectric Project records, was approximately 171 cubic feet per second during the August 23, 2011 sampling event. Sampling occurred between 8:30 a.m. and 9:02 a.m. Samples were taken without incident. No unusual Temperature readings were observed. However, the D.O. dropped below the state minimum standard of 5.0 mg/l between 5 and 6 meters (4.10 mg/l) and continued to drop through the entire sampling column including the last sample taken at .5 meters above the bottom (2.13 mg/l). Agency personnel were notified via e-mail of these events on August 23, 2011. Samples for laboratory analysis were delivered to Northern Lake Service, Inc in Crandon, WI on August 24, 2011. Northern Lake Service, Inc issued a laboratory report on August 29, 2011. No unusual levels of Chlorophyll a, True Color, or Total Phosphorus were noted in the laboratory reports.

In general, the weather during the 2011 monitoring season was about normal. Average temperatures were approximately 0.1 to 4.3 degrees below normal during the months of April, July, and August and 1.9 to 2.1 degrees above normal for the months of May and June. However, precipitation was above normal during the months of April and July, and August and below normal for the months of May and June. (**Refer to 2011 Monthly Temperature and Precipitation Table page 7**)

A summary of a comparison between the 2010 and 2011 (**Refer to 2011 Clam River Project Sampling Comparison Table 2010-2011 page 8**) sampling results are as follows:

1. Water Clarity – Decreased
2. Chlorophyll a – Increased
3. Color – Decreased
4. Total Phosphorus – Increased in April and July – Decreased in August
5. Overall D.O. – Increased in July and August – Decreased in April
6. Water Temperatures – Remained the Same or Increased in July – Decreased in April

Correspondence from the agencies during 2010 indicated they would prefer that notifications of incidents be by e-mail only and that telephone contacts are not needed. . That and all other correspondence can be found on page 13, **Appendix D**. The next scheduled Water Quality Monitoring at the Clam River Hydroelectric Project is set to take place in 2012 beginning with the Ice-Out sampling event.

2011
Sampling Results
Table

Clam River Hydroelectric Project - FERC Project # 9185
2011 Water Quality Sampling Data

	April 27, 2011			July 13, 2011			August 23, 2011		
Project Flow (c.f.s.)	400			271			171		
Dissolved Oxygen	**Time**	**D.O. (mg/L)**	**Water Temp. (°C)**	**Time**	**D.O. (mg/L)**	**Water Temp. (°C)**	**Time**	**D.O. (mg/L)**	**Water Temp. (°C)**
0.5 meter below surface	10:28 AM	11.88	9.4	2:05 PM	7:40	27.4	8:46 AM	10.35	22.6
1 meter below surface	10:29 AM	11.80	9.4	2:06 PM	13.12	26.4	8:48 AM	10.34	22.7
2 meter below surface	10:30 AM	11.80	9.3	2:07 PM	9.76	25.8	8:50 AM	10.25	22.8
3 meter below surface	10:31 AM	11.77	9.3	2:08 PM	8.59	25.6	8:52 AM	8.21	22.9
4 meter below surface	10:33 AM	11.77	9.3	2:09 PM	7.43	25.4	8:54 AM	6.44	22.4
5 meter below surface	10:34 AM	11.67	9.3	2:10 PM	7.06	25.4	8:56 AM	5.48	22.2
6 meter below surface	10:35 AM	11.63	9.3	2:11 PM	5.38	25.3	9:00 AM	2.36	21.8
7 meter below surface	10:37 AM	11.58	9.3	N/A	#N/A	#N/A	#N/A	#N/A	#N/A
.5 meter above bottom	10:37 AM	11.58	9.3	6:00 AM	5.11	25.2	9:03 AM	2.13	21.6
Secchi Disk	**Time**	**Depth (mtr)**		**Time**	**Depth (mtr)**		**Time**	**Depth (mtr)**	
Meters below surface	10:15 AM	0.87		2:15 PM	0.70		8:45 AM	0.90	
Chlorophyll a	**Time**	**ug/L**		**Time**	**ug/L**		**Time**	**ug/L**	
1 meter below surface	10:20 AM	17.00		2:15 PM	62.00		8:30 AM	34.00	
Color (True)	**Time**	**C.P.U. Units**	**LOD**	**Time**	**C.P.U. Units**	**LOD**	**Time**	**C.P.U. Units**	**LOD**
1 meter below surface	10:21 AM	40.0	5.0*	2:01 PM	80.0	10*	8:32 AM	100.0	10*
Total Phosphorus	**Time**	**mg/L**	**LOD**	**Time**	**mg/L**	**LOD**	**Time**	**mg/L**	**LOD**
1 meter below surface	10:23 AM	0.073	0.0070*	2:02 PM	0.110	0.0070*	8:34 AM	0.061	0.0070*
1 meter above bottom	10:25 AM	0.066	0.0070*	2:04 PM	0.083	0.0070*	8:36 AM	0.066	0.0070*

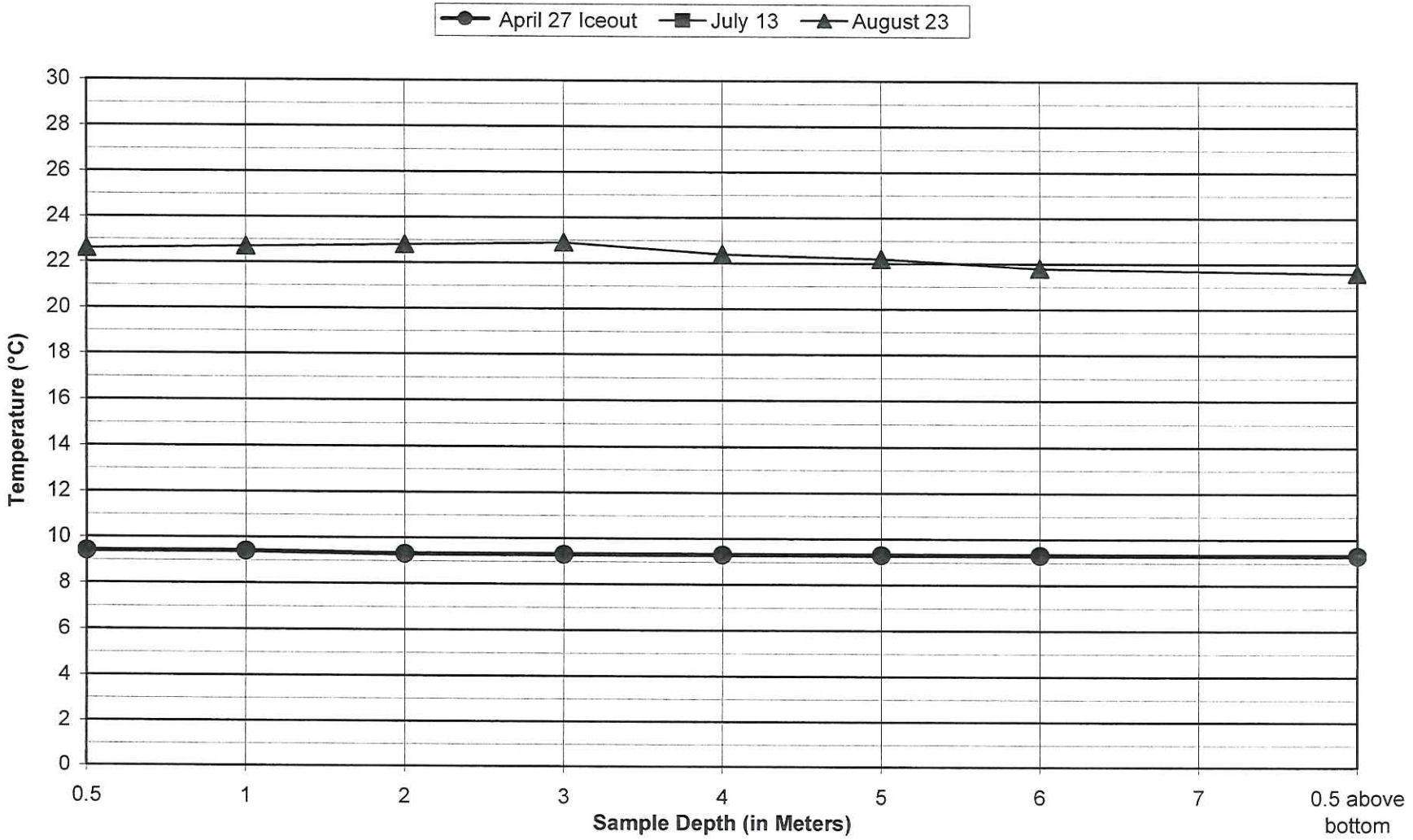
*** Considered Reporting Limits**

2011

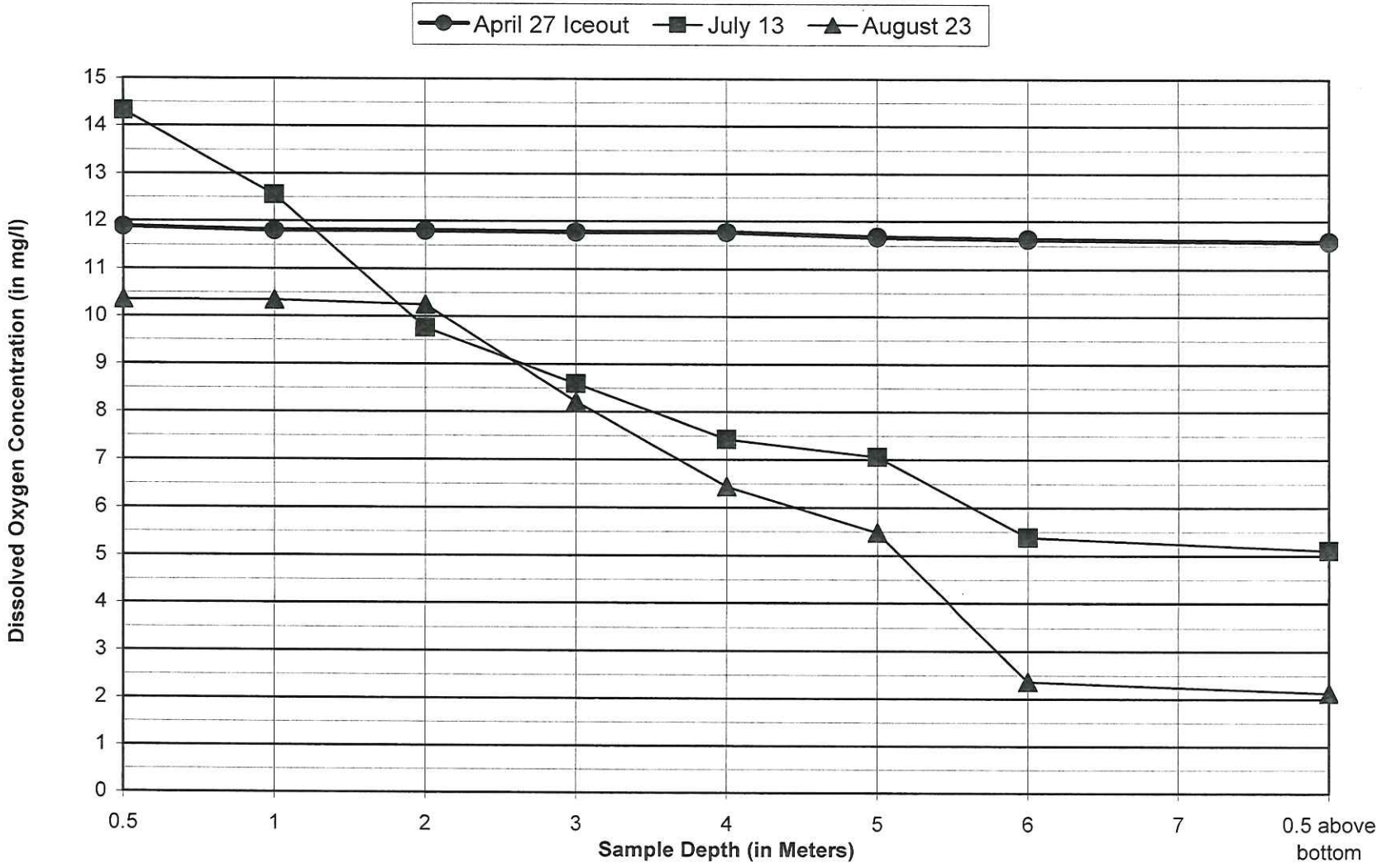
Graphed Data

Temperature and Dissolved Oxygen

Clam River Impoundment - FERC # 9185
2011 Temperature Samples



Clam River Impoundment - FERC # 9185
2011 Dissolved Oxygen Samples



2011
Monthly
Temperature and Precipitation
Table

2011 Water Year Monthly Temperature and Precipitation for Danbury, Wisconsin

Month	Highest Temp.	Lowest Temp.	Average Temp.	Departure From Normal	Heating Degree Days	Normal Degree Days	Total Precip.	Total Snowfall	Normal Precip.	% of Normal Precipitation
October-10	77	22	46.9	3.4	554	682	3.88	7.7	2.46	158%
November-10	56	3	30.5	2.5	1032	1124	2.42	27.9	2.12	114%
December-10	36	-16	12.8	-1.2	1609	1587	2.08	18.1	0.94	221%
January-11	26	-25	7.1	-1.3	1788	1771	1.11	18.5	1.12	99%
February-11	52	-18	14.5	-0.3	1405	1422	0.31	3.2	0.83	37%
March-11	46	-11	24.0	-1.4	1263	1244	0.82	7.4	1.69	49%
April-11	65	24	39.1	0.1	770	787	3.79	10.6	2.09	181%
May-11	75	27	49.7	-2.1	465	421	2.27	T	2.95	77%
June-11	83	42	58.0	-1.9	204	180	3.72	0.0	4.25	88%
July-11	92	49	69.8	4.3	28	69	4.57	0.0	4.20	109%
August-11	86	29	66.8	2.5	23	86	5.71	0.0	3.70	154%
September-11	84	30	56.2	0.6	287	298	1.48	T	4.11	36%

Source: NOAA/Duluth, MN

To calculate HDD or Heating Degree Days--If the departure from normal is a negative number (-) you add this to the total below the HDD column
If the departure from normal is a plus number (+) you subtract this from the total below the HDD column
Calculations for NDD or Normal Degree Days follow the same formula

2011
Clam River
Sampling Comparison Table
2010—2011

2011 Clam River
Project Sampling Comparison Table
To Previous Year

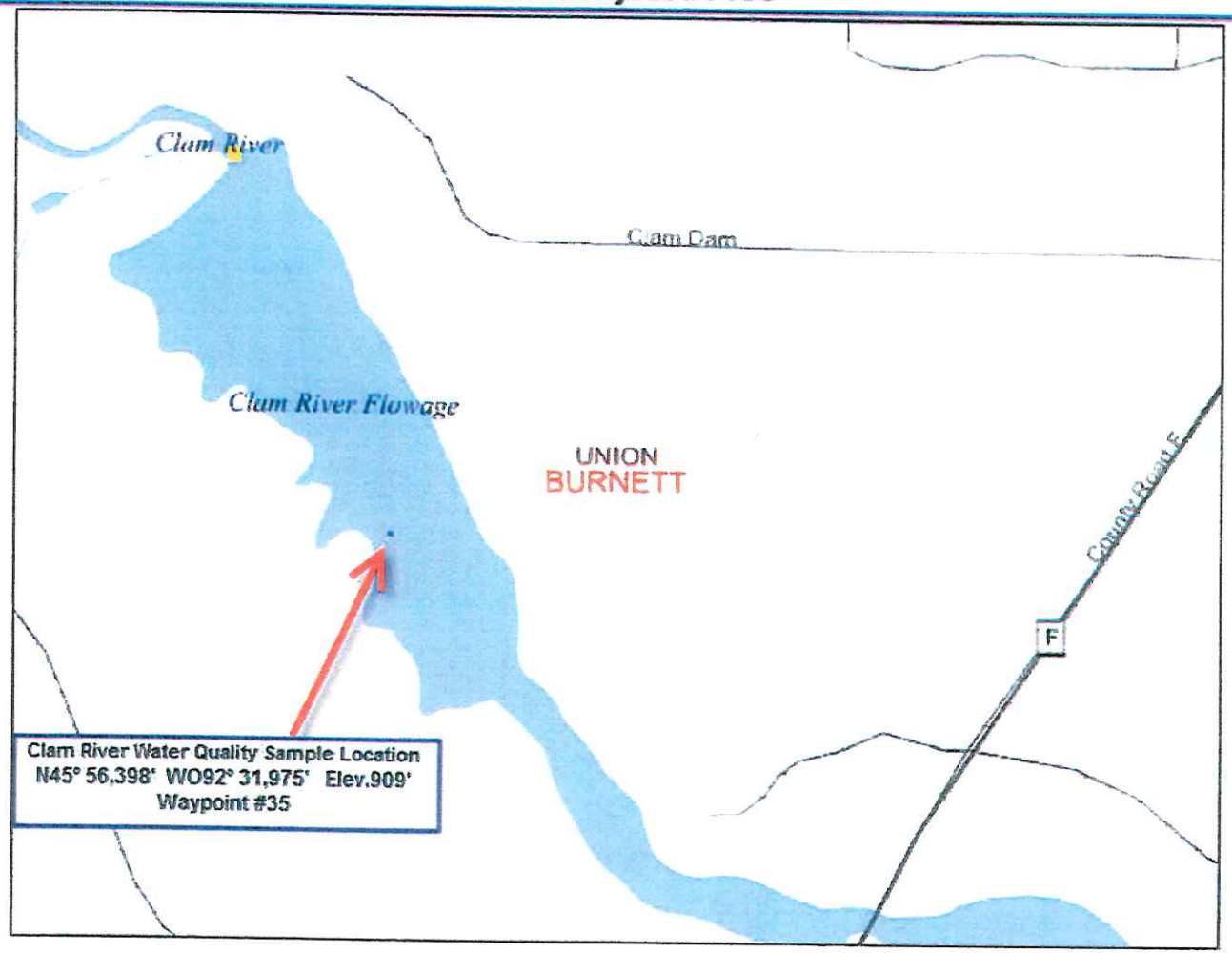
Year	Month	Secchi Disk Depth (m)	Chlorophyll a ug/l	Color (True) C.P.U. Units	Total Phosphorus Below Surface mg/l	Total Phosphorus Above Bottom mg/l	Lowest D.O. mg/l	Highest D.O. mg/l	Lowest Water Temp. °C	Highest Water Temp. °C
2010	April	1.3	16	50.0	.066	.057	10.72	13.09	11.0	12.1
2011	April	.87	17.0	40	.073	.066	11.58	11.88	9.3	9.4
2010	July	1.0	44	150.0	.086	.077	.16	9.25	24.0	27.2
2011	July	.70	62	80	0.11	0.083	5.11	14.32	25.2	27.1
2010	August	.9	9.9	200	.077	.082	3.32	4.16	23.3	24.4
2011	August	.9	34	100	0.061	0.066	2.13	10.35	21.6	22.9

Clam River Hydroelectric Project

Sampling Location

Map

Clam River Hydroelectric Project
Water Quality Sampling Location Map
FERC Project #9185



Legend

- Dams
- Major Highways
- Interstate
- State Highway
- U.S. Highways
- County Roads
- Local Roads
- 24K County Boundaries
- Civil Towns
- Civil Town
- 24K Open Water
- 24K Rivers and Shorelines
- Cities and Villages
- Village
- City

Scale: 1:8,967

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Appendix A

April 27, 2011 Sampling Documents

IMPOUNDMENT SAMPLING LOG

2011 Water Quality Study - Clam River Hydroelectric Project - FERC #9185

HWL 899.05 CFS 400

Date: 4/27/11

Pre-Sampling Data:

Time: 10:00 Barometer: 29.61 Air Temp: 1.66 °C Wind Speed: NE 12 MPH GUSTING 16 MPH

Sky Conditions: CLOUDY/OVERCAST + SNO FLURRIES

Precipitation within Last 24 Hours: YES

D.O. Meter Calibration: Instrument Model Used: HQ 40D

Where The Batterys Changed? ☒ Yes ☐ No If Yes, When Changed: 4/27/11

Battery Status: FULL Charge

Calibration Time: March 2011 Method: Factory

Sampling Depth Profile: Measured Depth to Bottom of the Impoundment: 7.5 Meter

Secchi Disk Depth: (E0.1 Meter): .87 Meter. Time: 10:15

Chlorophyll a (1 Meter below surface)

Lab Sample I.D. #: 20110427 1A		
Time	Quantity (ml)	Filtered
10:20	1000	NO

True Color (1 Meter below surface)

Lab Sample I.D. #: 20110427 1B	
Time	Quantity (ml)
10:21	250

D.O. Sample Data

Depth	Time	D.O. (mg/l)	°C
0.5 Meter below surface	10:28	11.88	9.4
1 Meter	10:29	11.80	9.4
2 Meter	10:30	11.80	9.3
3 Meter	10:31	11.77	9.3
4 Meter	10:33	11.77	9.3
5 Meter	10:34	11.67	9.3
6 Meter	10:35	11.63	9.3
7 Meter	10:37	11.58	9.3
8 Meter			
0.5 Meter above bottom	10.37	11.58	9.3

Phosphorus

Lab Sample I.D. #: 20110427 1C (1 Meter below surface)	
Time	Preserved ?
10:23	H_2SO_4

Lab Sample I.D. #: 20110427 1D (1 Meter above bottom)	
Time	Preserved ?
10:25	H_2SO_4

Comments: Sampling location is N45 56.398 W92 31.975

Performed By: GARY RAST & JOHN CHAMBERLIN

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

ORIGINAL RECEIVED
MAY - 4 2011
NORTH AMERICAN HYDRO

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

Printed: 05/02/11 Code: NNNN-S

NLS Project: 161164
NLS Customer: 93918

Fax: 920 293 8087 Phone: 920 293 4628

Client: North American Hydro Holdings Inc
Attn: Gary Rast
116 North State Street
P O Box 167
Neshkoro, WI 54960 0167

Project: Clam River

201104271 A NLS ID: 609560
COC: 131787:1 Matrix: SW
Collected: 04/27/11 10:20 Received: 04/28/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Chlorophyll, all species	see attached					05/02/11	10200-H	721026460
Lab filtration for Chlorophyll	yes					04/28/11	NA	721026460

201104271 B NLS ID: 609561
COC: 131787:2 Matrix: SW
Collected: 04/27/11 10:21 Received: 04/28/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Color, APHA (true)	40	C.P.U.	1	5.0*		04/28/11	SM 2120-B 20ed	721026460
Lab filtration	yes					04/28/11	NA	721026460

The sample was filtered to remove turbidity for true color determination.

201104271 C NLS ID: 609562
COC: 131787:3 Matrix: SW
Collected: 04/27/11 10:23 Received: 04/28/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.073	mg/L	1	0.0070*		04/29/11	SM 4500P-E 20ed	721026460

201104271 D NLS ID: 609563
COC: 131787:4 Matrix: SW
Collected: 04/27/11 10:25 Received: 04/28/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.066	mg/L	1	0.0070*		04/29/11	SM 4500P-E 20ed	721026460

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:

Authorized by:
R. T. Krueger
President

Northern Lake Service, Inc.
Chlorophyll Results

Customer: North American Hydro Holdings Inc
Project: 161164
Clam River

Sample	Description	CC a	Pheo a	TC a	TC b	TC c
609560	201104271 A	19	0.0*	17	0.0*	0.0*

CC a = Corrected Chlorophyll a
Pheo a = Pheophytin a
TC a = Trichromatic Chlorophyll a
TC b = Trichromatic Chlorophyll b
TC c = Trichromatic Chlorophyll c
Units = ug/L for Water, ug/cm^2 for periphyton samplers

*: The complex calculations used to differentiate the various chlorophyll species magnify error at low concentrations and sometimes produce negative values, which are reported as 0.0 on this report.

SAMPLE COLLECTION AND CHAIN OF CUSTODY RECORD

NORTHERN LAKE SERVICE, INC.

Analytical Laboratory and Environmental Services

400 North Lake Avenue • Crandon, WI 54520-1298

Tel: (715) 478-2777 • Fax: (715) 478-3060

Wisconsin Lab Cert. No. 721026460

WI DATCP 105-000330

NO. 131787

CLIENT	NORTH AMERICAN HYDRO HOLDINGS LLC
ADDRESS	P.O BOX 157 116 STATE STREET
CITY / STATE / ZIP	NESHKORO / WIS / 54960
PROJECT DESCRIPTION / NO.	CHAM RIVER
QUOTATION NO.	
DNR FID #	
DNR LICENSE #	
CONTACT	GARY RAST
PHONE	920-293-4628 EXT 15
PURCHASE ORDER NO.	
FAX	

MATRIX:
SW = surface water
WW = waste water
GW = groundwater
DW = drinking water
TIS = tissue
AIR = air
SOIL = soil
SED = sediment
PROD = product
SL = sludge
OTHER

USE BOXES BELOW: Indicate Y or N if GW Sample is field filtered.
Indicate G or C if WW Sample is Grab or Composite.

ITEM NO.	NLS LAB. NO.	SAMPLE ID	COLLECTION DATE	COLLECTION TIME	MATRIX (See above)	ANALYZE PER ORDER OF ANALYSIS: CHLOROPHYLL A	TRC COLOR	PHOS PHOSPHORUS	PHOS DIHYDRO	COLLECTION REMARKS (i.e. DNR Well ID #)
1.	609560	20110427 1 A	4/27/11	10:20	RIVER WATER	X				
2.	561	20110427 1 B	"	10:21	"		X			
3.	562	20110427 1 C	"	10:23	"			X		
4.	563	20110427 1 D	"	10:25	"				X	
5.										
6.										
7.										
8.										
9.										
10.										

COLLECTED BY (signature)	CUSTODY SEAL NO. (IF ANY)	DATE/TIME 4/27/11 1015
RELINQUISHED BY (signature)	RECEIVED BY (signature)	DATE/TIME
DISPATCHED BY (signature)	METHOD OF TRANSPORT: UPS	DATE/TIME 4/27/11 3:00 PM

REPORT TO: SAME AS ABOVE ATTN: GARY

RECEIVED AT NLS BY (signature): Annamarie Cooke	DATE/TIME: 4/28/11 9:50	CONDITION: cool	TEMP.
COOLER #: 8-582	REMARKS & OTHER INFORMATION		
	WDNR FACILITY NUMBER	E-MAIL ADDRESS	

INVOICE TO: SAME AS ABOVE

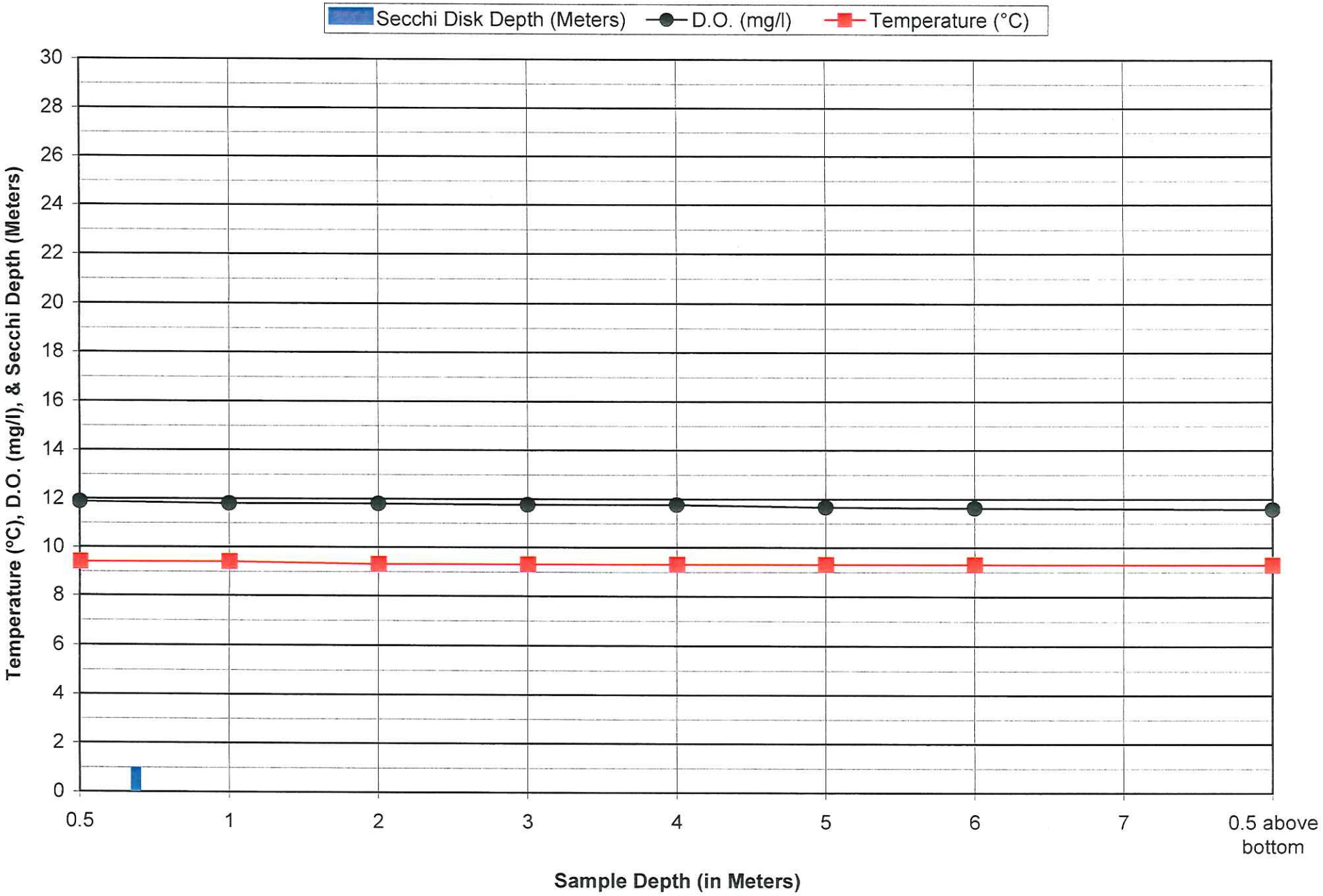
PRESERVATIVE:
NP = no preservative
S = sulfuric acid
N = nitric acid
Z = zinc acetate
M = methanol
OH = sodium hydroxide
HA = hydrochloric & ascorbic acid
H = hydrochloric acid

IMPORTANT

1. TO MEET REGULATORY REQUIREMENTS, THIS FORM **MUST** BE COMPLETED IN DETAIL AND INCLUDED IN THE COOLER CONTAINING THE SAMPLES DESCRIBED.
2. PLEASE USE ONE LINE PER SAMPLE, **NOT** PER BOTTLE.
3. RETURN THIS FORM WITH SAMPLES - CLIENT MAY KEEP PINK COPY.
4. PARTIES COLLECTING SAMPLE, LISTED AS **REPORT TO** AND LISTED AS **INVOICE TO** AGREE TO STANDARD TERMS & CONDITIONS ON REVERSE.

DUPLICATE COPY

Clam River Impoundment - FERC # 9185
April 27, 2011 Iceout Sampling Event



Appendix B

July 13, 2011 Sampling Documents

IMPOUNDMENT SAMPLING LOG

2011 Water Quality Study - Clam River Hydroelectric Project - FERC #9185

HWL - 898.74
CFS - 271

Date: 7/13/11

Pre-Sampling Data:

Time: 1:50 Barometer: 30.17 Air Temp: 21.66°C Wind Speed: NE 7MPH

Sky Conditions: BRIGHT SUNSHINE But PARTLY CLOUDY, BREEZE

Precipitation within Last 24 Hours: NO

D.O. Meter Calibration: Instrument Model Used: HACH HQ40d

Where The Batterys Changed? ☐ Yes ☒ No If Yes, When Changed:

Battery Status: 70% Charge

Calibration Time: March 2011 Method: Factory

Sampling Depth Profile: Measured Depth to Bottom of the Impoundment: 7.4 Meter

Secchi Disk Depth: (E0.1 Meter): .7 Meter. Time: 2:15

Chlorophyll a (1 Meter below surface)

Lab Sample I.D. #: 20110713-1A		
Time	Quantity (ml)	Filtered
2:00	1000	NO

True Color (1 Meter below surface)

Lab Sample I.D. #: 20110713-1B	
Time	Quantity (ml)
2:01	250

D.O. Sample Data

Depth	Time	D.O. (mg/l)	°C
0.5 Meter below surface	2:05	14.32	27.4
1 Meter	2:06	12.55	26.4
2 Meter	2:07	9.76	25.8
3 Meter	2:08	8.59	25.6
4 Meter	2:10	7.43	25.4
5 Meter	2:11	7.06	25.4
6 Meter	2:17	5:38	25.3
7 Meter			
8 Meter			
0.5 Meter above bottom	2:25	5:11	25.2

Phosphorus

Lab Sample I.D. #: 20110713-1C (1 Meter below surface)	
Time	Preserved ?
2:02	H_2SO_4

Lab Sample I.D. #: 20110713-1D (1 Meter above bottom)	
Time	Preserved ?
2:04	H_2SO_4

Comments: Sampling location is N45 56.398 W92 31.975

Performed By: GARY RAST & NORBERT REHDER Gary Rast

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

Printed: 07/22/11 Code: NNNN-S

NLS Project: 164793
NLS Customer: 93918

Client: North American Hydro Holdings Inc
Attn: Gary Rast
116 North State Street
P O Box 167
Neshkoro, WI 54960 0167

Fax: 920 293 8087 Phone: 920 293 4628

Project: Clam River

20110713-1A NLS ID: 621416
COC: 134046:1 Matrix: SW
Collected: 07/13/11 14:00 Received: 07/14/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Chlorophyll, all species	see attached					07/21/11	10200-H	721026460
Lab filtration for Chlorophyll	yes					07/14/11	NA	721026460

20110713-1B NLS ID: 621417
COC: 134046:2 Matrix: SW
Collected: 07/13/11 14:01 Received: 07/14/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Color, APHA (true)	80	C.P.U.	2	10*		07/14/11	SM 2120-B 20ed	721026460

20110713-1C NLS ID: 621418
COC: 134046:3 Matrix: SW
Collected: 07/13/11 14:02 Received: 07/14/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.11	mg/L	1	0.0070*		07/15/11	SM 4500P-E 20ed	721026460

20110713-1D NLS ID: 621419
COC: 134046:4 Matrix: SW
Collected: 07/13/11 14:04 Received: 07/14/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.083	mg/L	1	0.0070*		07/15/11	SM 4500P-E 20ed	721026460

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:

Authorized by:
R. T. Krueger
President

Northern Lake Service, Inc.
Chlorophyll Results

Customer: North American Hydro Holdings Inc
Project: 164793
Clam River

Sample	Description	CC a	Pheo a	TC a	TC b	TC c
621416	20110713-1A	65	0.0*	62	1.5	3.7

CC a = Corrected Chlorophyll a
Pheo a = Pheophytin a
TC a = Trichromatic Chlorophyll a
TC b = Trichromatic Chlorophyll b
TC c = Trichromatic Chlorophyll c
Units = ug/L for Water, ug/cm^2 for periphyton samplers

*: The complex calculations used to differentiate the various chlorophyll species magnify error at low concentrations and sometimes produce negative values, which are reported as 0.0 on this report.

SAMPLE COLLECTION AND CHAIN OF CUSTODY RECORD

Wisconsin Lab Cert. No. 721026460
WI DATCP 105-000330

NORTHERN LAKE SERVICE, INC.

Analytical Laboratory and Environmental Services

400 North Lake Avenue • Crandon, WI 54520-1298
Tel: (715) 478-2777 • Fax: (715) 478-3060

NO. 134046

CLIENT: NORTH AMERICAN HYDRO	
ADDRESS: PO BOX 167 116 STATE STREET	
CITY: NESHKORO STATE: WI ZIP: 54960	
PROJECT DESCRIPTION / NO.: CLAM RIVER	QUOTATION NO.
DNR FID #	DNR LICENSE #
CONTACT: GARY RAST	PHONE: 920-293-4628
PURCHASE ORDER NO.: VERBAL	FAX

MATRIX:
SW = surface water
WW = waste water
GW = groundwater
DW = drinking water
TIS = tissue
AIR = air
SOIL = soil
SED = sediment
PROD = product
SL = sludge
OTHER

USE BOXES BELOW: Indicate Y or N if GW Sample is field filtered.
Indicate G or C if WW Sample is Grab or Composite.

ANALYZE PER ORDER OF ANALYSIS

ITEM NO.	NLS LAB. NO.	SAMPLE ID	COLLECTION DATE	COLLECTION TIME	MATRIX (See above)		Chlorophyll	True Color	Phosphorus	Phosphorus								COLLECTION REMARKS (i.e. DNR Well ID #)
1.	621416	20110713-1A	7/13/11	2:00	RIVER WATER		X											
2.	417	20110713-1B	11	2:01				X										
3.	418	20110713-1C	11	2:02					X									
4.	419	20110713-1D	11	2:04						X								
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		

COLLECTED BY (signature): [signature]	CUSTODY SEAL NO. (IF ANY)	DATE/TIME: 7/13/11 2:00-2:04
RELINQUISHED BY (signature): [signature]	RECEIVED BY (signature)	DATE/TIME: 7/13/11 3:40
DISPATCHED BY (signature): [signature]	METHOD OF TRANSPORT: UPS	DATE/TIME: 7/13/11 3:40

REPORT TO: SAME

INVOICE TO: SAME

RECEIVED AT NLS BY (signature): [signature]	DATE/TIME: 7/14/11 10	CONDITION: [illegible]	TEMP.
COOLER # 10-1190	REMARKS & OTHER INFORMATION: UPS		
	WDNR FACILITY NUMBER	E-MAIL ADDRESS	

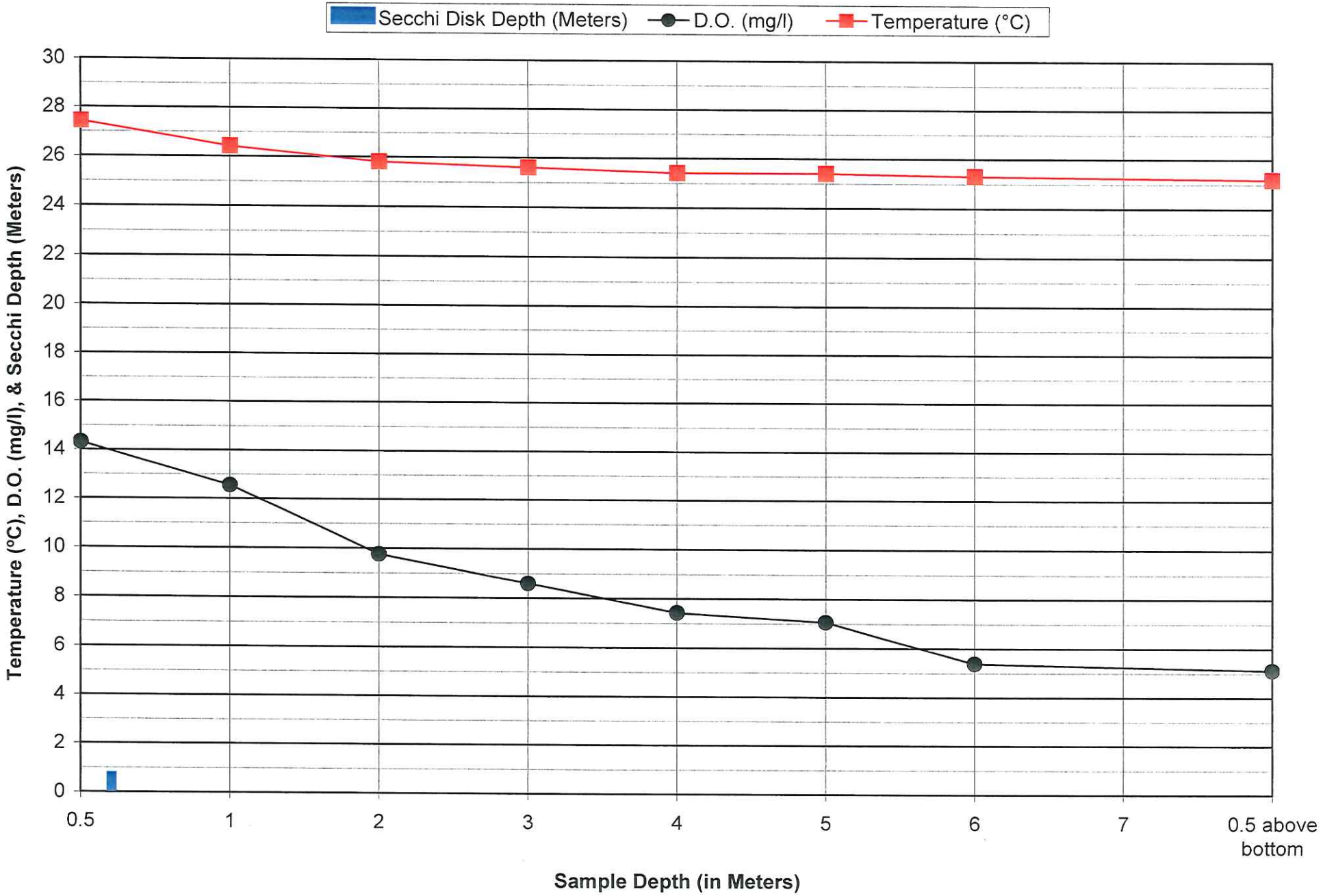
PRESERVATIVE:
NP = no preservative
S = sulfuric acid
N = nitric acid
Z = zinc acetate
M = methanol
OH = sodium hydroxide
HA = hydrochloric & ascorbic acid
H = hydrochloric acid

IMPORTANT

1. TO MEET REGULATORY REQUIREMENTS, THIS FORM **MUST** BE COMPLETED IN DETAIL AND INCLUDED IN THE COOLER CONTAINING THE SAMPLES DESCRIBED.
2. PLEASE USE ONE LINE PER SAMPLE, **NOT** PER BOTTLE.
3. RETURN THIS FORM WITH SAMPLES - CLIENT MAY KEEP PINK COPY.
4. PARTIES COLLECTING SAMPLE, LISTED AS **REPORT TO** AND LISTED AS **INVOICE TO** AGREE TO STANDARD TERMS & CONDITIONS ON REVERSE.

DUPLICATE COPY

Clam River Impoundment - FERC # 9185
July 13, 2011 Sampling Event



Appendix C

August 23, 2011 Sampling Documents

IMPOUNDMENT SAMPLING LOG

2011 Water Quality Study - Clam River Hydroelectric Project - FERC #9185

HWL - 898.70
TWL - 863.70 CFS - 171

Date: 8/23/11

Pre-Sampling Data:

Time: 8:30 Barometer: 29.70 Air Temp: 17.4 °C Wind Speed: SW 8MPH

Sky Conditions: FAIR + CLEAR - SOME DRIZZEL

Precipitation within Last 24 Hours: YES

D.O. Meter Calibration: Instrument Model Used: HACH HQ400

Where The Batterys Changed? ☐ Yes ☒ No If Yes, When Changed:

Battery Status: 60 % Charge

Calibration Time: March 2011 Method: Factory

Sampling Depth Profile: Measured Depth to Bottom of the Impoundment: 7.3 Meter

Secchi Disk Depth: (E0.1 Meter): .9 Meter. Time: 8:45

Chlorophyll a (1 Meter below surface)

Lab Sample I.D. #: 20110823 1A		
Time	Quantity (ml)	Filtered
8:30	1000	N

True Color (1 Meter below surface)

Lab Sample I.D. #: 20110823 1B	
Time	Quantity (ml)
8:32	250

D.O. Sample Data

Depth	Time	D.O. (mg/l)	°C
0.5 Meter below surface	8:46	10.35	22.6
1 Meter	8:48	10.34	22.7
2 Meter	8:50	10.25	22.8
3 Meter	8:52	8.21	22.9
4 Meter	8:54	6.44	22.4
5 Meter	8:56	5.48	22.2
6 Meter	9:00	2.36	21.8
7 Meter			
8 Meter			
0.5 Meter above bottom	9:03	2.13	21.6

Phosphorus

Lab Sample I.D. #: 20110823 1C (1 Meter below surface)	
Time	Preserved ?
8:34	H2SO4

Lab Sample I.D. #: 20110823 1D (1 Meter above bottom)	
Time	Preserved ?
8:36	H2SO4

Comments: Sampling location is N45 56.398 W92 31.975

5.5 - 8:58 4.10 22.0

6.5 - 9:02 2.13 21.6

Performed By: GARY RAST

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 166905
NLS Customer: 93918

Client: **North American Hydro Holdings Inc**
Attn: Gary Rast
116 North State Street
P O Box 167
Neshkoro, WI 54960 0167

Fax: 920 293 8087 Phone: 920 293 4628

Project: **Clam River**

201108231A NLS ID: 628341
COC: 136133:1 Matrix: SW
Collected: 08/13/11 08:30 Received: 08/24/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Chlorophyll, all species	see attached					08/24/11	10200-H	721026460
Lab filtration for Chlorophyll	yes					08/24/11	NA	721026460

201108231B NLS ID: 628342
COC: 136133:2 Matrix: SW
Collected: 08/13/11 08:32 Received: 08/24/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Color, APHA (true)	100	C.P.U.	2	10*		08/24/11	SM 2120-B 20ed	721026460

201108231C NLS ID: 628343
COC: 136133:3 Matrix: SW
Collected: 08/13/11 08:34 Received: 08/24/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.061	mg/L	1	0.0070*		08/26/11	SM 4500P-E 20ed	721026460

201108231D NLS ID: 628344
COC: 136133:4 Matrix: SW
Collected: 08/13/11 08:36 Received: 08/24/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Phosphorus, tot. as P	0.066	mg/L	1	0.0070*		08/26/11	SM 4500P-E 20ed	721026460

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:

Authorized by:
R. T. Krueger
President

Northern Lake Service, Inc.
Chlorophyll Results

Customer: North American Hydro Holdings Inc
Project: 166905
Clam River

Sample	Description	CC a	Pheo a	TC a	TC b	TC c
628341	201108231A	32	2.5	34	0.27	2.3

CC a = Corrected Chlorophyll a
Pheo a = Pheophytin a
TC a = Trichromatic Chlorophyll a
TC b = Trichromatic Chlorophyll b
TC c = Trichromatic Chlorophyll c
Units = ug/L for Water, ug/cm^2 for periphyton samplers

*: The complex calculations used to differentiate the various chlorophyll species magnify error at low concentrations and sometimes produce negative values, which are reported as 0.0 on this report.

SAMPLE COLLECTION AND CHAIN OF CUSTODY RECORD

NORTHERN LAKE SERVICE, INC.

Analytical Laboratory and Environmental Services

400 North Lake Avenue • Crandon, WI 54520-1298

Tel: (715) 478-2777 • Fax: (715) 478-3060

Wisconsin Lab Cert. No. 721026460

WI DATCP 105-000330

NO. 130133

CLIENT	NORTH AMERICAN HYDRO
ADDRESS	116 N STATE STREET
CITY / STATE / ZIP	NESHKORO / WI / 54960
PROJECT DESCRIPTION / NO.	WOLF RIVER
QUOTATION NO.	
DNR FID #	
DNR LICENSE #	
CONTACT	GARY
PHONE	920-293-4628
PURCHASE ORDER NO.	GARY
FAX	

MATRIX:
SW = surface water
WW = waste water
GW = groundwater
DW = drinking water
TIS = tissue
AIR = air
SOIL = soil
SED = sediment
PROD = product
SL = sludge
OTHER

USE BOXES BELOW: Indicate Y or N if GW Sample is field filtered.
Indicate G or C if WW Sample is Grab or Composite.

ITEM NO.	NLS LAB. NO	SAMPLE ID	COLLECTION DATE	COLLECTION TIME	MATRIX (See above)	ANALYZE PER ORDER OF ANALYSIS: Chlorophyll a	True color	Phosphorus	Silica	COLLECTION REMARKS (i.e. DNR Well ID #)
1.	342341	20110823 1A	8/23/11	8:30	RIVER WATER	X				DNR 1634
2.	342	20110823 1B	"	8:32	"		X			
3.	342	20110823 1C	"	8:34	"			X		
4.	342	20110823 1D	"	8:36	"				X	
5.										
6.										
7.										
8.										
9.										
10.										

COLLECTED BY (signature)	CUSTODY SEAL NO. (IF ANY)	DATE/TIME 8/23/11 8:30-8:36
RELINQUISHED BY (signature)	RECEIVED BY (signature)	DATE/TIME 8/23/11 10:00
DISPATCHED BY (signature)	METHOD OF TRANSPORT: UPS	DATE/TIME 8/23/11 10:00

REPORT TO: SAME ATTN: GARY

INVOICE TO: SAME

RECEIVED AT NLS BY (signature)	DATE/TIME 8/24/11	CONDITION on ice	TEMP.
COOLER # 16-910	REMARKS & OTHER INFORMATION		
	WDNR FACILITY NUMBER	E-MAIL ADDRESS	

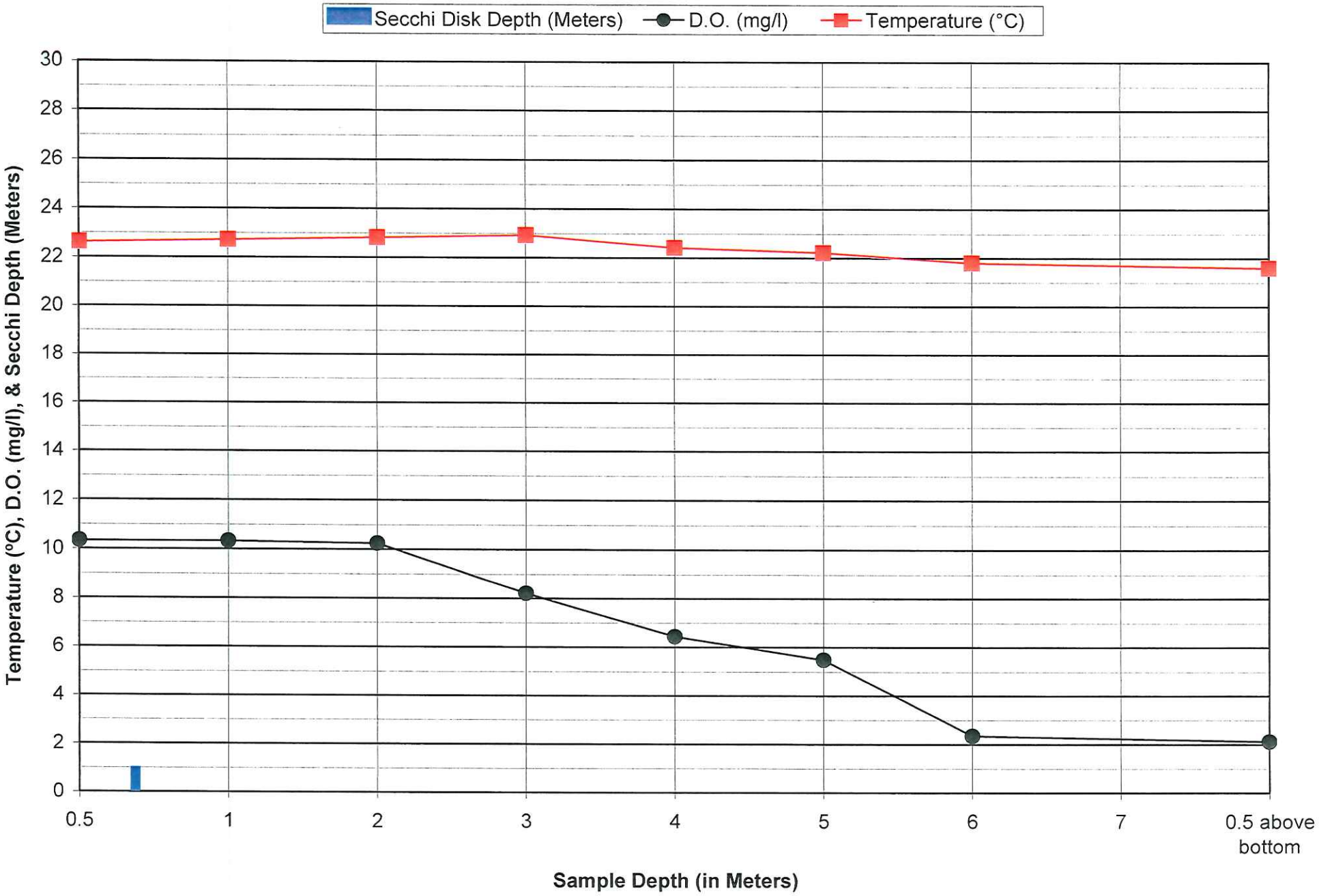
PRESERVATIVE:
NP = no preservative
S = sulfuric acid
N = nitric acid
Z = zinc acetate
M = methanol
OH = sodium hydroxide
HA = hydrochloric & ascorbic acid
H = hydrochloric acid

IMPORTANT

1. TO MEET REGULATORY REQUIREMENTS, THIS FORM **MUST** BE COMPLETED IN DETAIL AND INCLUDED IN THE COOLER CONTAINING THE SAMPLES DESCRIBED.
2. PLEASE USE ONE LINE PER SAMPLE, **NOT** PER BOTTLE.
3. RETURN THIS FORM WITH SAMPLES - CLIENT MAY KEEP PINK COPY.
4. PARTIES COLLECTING SAMPLE, LISTED AS **REPORT TO** AND LISTED AS **INVOICE TO** AGREE TO STANDARD TERMS & CONDITIONS ON REVERSE.

DUPLICATE COPY

Clam River Impoundment - FERC # 9185
August 23, 2011 Sampling Event



Appendix D

Agency Correspondence

FILE COPY

Gary Rast

From: Gary Rast
Sent: Tuesday, August 23, 2011 6:36 PM
To: 'Nick_Utrup@fws.gov'; 'daniel.houston@wi.gov'; 'jeffrey.scheirer@wisconsin.gov'
Cc: John Chamberlin
Subject: Clam River Below Std. DO

Nick, Dan, Jeff,

I just returned from performing the August WQ sampling (8/23/11) at the Clam River Hydro Project FERC #9185. Some below standard DO measurements beginning at 5.5 meters from the surface of the impoundment were encountered. Below standard results from the survey are as follows:

5.5 Meter – 4.10 mg/L & 22.2 °C
6.0 Meter – 2.36 mg/L & 21.8 °C
6.5 Meter – 2.13 mg/L & 21.6 °C
0.5 Meter from bottom – 2.13 mg/L & 21.6 °C

Gary

Gary Rast
Environmental Specialist
North American Hydro Holdings
116 N. State Street
P.O. Box 167
Neshkoro, WI 54960

Tel: 920-293-4628 Ext 15
Cell: 920-570-0995
Fax: 920-293-8087
Email: gary.rast@nahydro.com

Gary Rast FILE COPY

From: Scheirer, Jeffrey W - DNR [Jeffrey.Scheirer@Wisconsin.gov]
Sent: Wednesday, August 25, 2010 9:32 AM
To: Gary Rast
Subject: RE: Low D O At Clam River

Gary, A notification by e-mail should be sufficient to meet your reporting requirements in the water quality monitoring plans for all of Flambeau Hydro's hydroelectric projects. There's really no need to contact the Department by phone and duplicate that contact with a follow-up e-mail when you detect dissolved oxygen concentrations below the standard of 5 mg/l. A single e-mail notice for each occurrence will be just fine. Please add Craig Roesler, our Water Quality Biologist, to the list of recipients for this notification. Craig's e-mail address is craig.roesler@wisconsin.gov. Thanks. Jeff Scheirer

---

From: Gary Rast [mailto:Gary.rast@nahydro.com]
Sent: Tuesday, August 24, 2010 9:26 AM
To: Louise_Clemency@fws.gov; Scheirer, Jeffrey W - DNR
Cc: Melissa Chamberlin
Subject: Low D O At Clam River

Dear Agencies,

This message is sent following a phone call to notify you of below standard DO readings (August) taken at the Clam River Hydro Project. The August water quality monitoring took place on August 23, 2010. Sampling started at 1:10 pm and ended at 1:34 pm. Low Dissolved Oxygen readings were encountered beginning at .5 meter from the surface (DO 4.16 & Temp 24.4) and continuing all the way thru the reading taken at .5 meter above bottom (DO 3.32 & Temp 23.3). Attached is a copy of the August DO Sample Data. If you have any questions please contact me using the contact information found below.

Gary

Gary Rast
Environmental Specialist
North American Hydro Holdings
116 N. State Street
P.O. Box 167
Neshkoro, WI 54960

Tel: 920-293-4628 Ext 15
Cell: 920-570-0995
Fax: 920-293-8087
Email: gary.rast@nahydro.com

FILE COPY

Gary Rast

From: Louise_Clemency@fws.gov
Sent: Wednesday, August 25, 2010 10:36 AM
To: Gary Rast
Cc: Nick_Utrup@fws.gov
Subject: Re: Notification Of Low DO @ Danbury

Attachments: pic19169.jpg; 10-08-25 GGR DNB 2010 Aug WQ Doc.pdf


pic19169.jpg


10-08-25 GGR DNB 2010 Aug WQ D...

Gary,
Thank you for the email notification below, which followed your phone message this morning.

If possible, I would prefer that you provide your FERC-required water quality monitoring notifications for all NA Hydro FERC-lisenced projects to
my office via email rather than via phone/voice mail message. The format
of your email, below, is a more useful format for us than a voice message.

Thank you,
Louise

Louise Clemency
Field Supervisor
Wisconsin Ecological Services Office
U.S. Fish and Wildlife Service
2661 Scott Tower Drive
New Franken, Wisconsin 54229-9565
920-866-1725
920-866-1710 Fax

"Gary Rast"
<Gary.rast@nahydro.com>
08/25/2010 09:20 AM

To
<Louise_Clemency@fws.gov>,
<jeffrey.scheirer@wisconsin.gov>
cc
"Melissa Chamberlin"
<melissa.chamberlin@nahydro.com>
Subject
Notification Of Low DO @ Danbury

Dear Agencies,

This message is sent following a phone call to notify you of below standard DO readings (August) taken at the Danbury Hydro Project. The August water quality monitoring took place on August 24, 2010. Sampling started at 11:10 am and ended at 11:28 am. Low Dissolved Oxygen readings were encountered beginning at .5 meter from the surface (DO 4.05 & Temp 24.8) and continuing all the way thru the reading taken at .5 meter above bottom (DO 3.31 & Temp 24.6). Attached is a copy of the August DO Sample Data.
If you have any questions please contact me using the contact information found below.

Gary

(Embedded image moved to file: pic19169.jpg) Gary Rast Environmental Specialist North American Hydro Holdings
116 N. State Street
P.O. Box 167
Neshkoro, WI 54960

Tel: 920-293-4628 Ext 15
Cell: 920-570-0995
Fax: 920-293-8087
Email: gary.rast@nahydro.com
(See attached file: 10-08-25 GGR DNB 2010 Aug WQ Doc.pdf)