Plant Operations
116 State Street
P. O. Box 167
Neshkoro, WI 54960 USA
Tel: 920-293-4628
Fax: 920-293-8087
Email: nah@nahydro.com

ORIGINAL

NORTH AMERICAN HYDRO INC.

Engineering & Manufacturing
1323 B Everest Avenue
Schofield, WI 54476 USA
Tel: 715-359-0209
Fax: 715-359-1049
Email: schofield@nahydro.com
Web: www.nahydro.com

April 14, 2003

Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

FILED
03 APR 17 PM 2:25
FEDERAL ENERGY REGULATORY COMMISSION

RE: Water Quality Monitoring Plan
Flambeau Hydro, LLC
Flambeau (Upper) Hydroelectric Project, FERC Project # 2640-030

Dear Ms. Salas;

Please find enclosed an original and eight copies of Flambeau Hydro, LLC's, *Water Quality Monitoring Plan* for the Flambeau (Upper) Hydraulic Project, # 2640. This plan was developed in consultation with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS). We did not concur with the request to shorten the reporting time. We are conducting sampling at all four projects on the same day to provide more useful information. We feel that the plan's reporting schedule is reasonable and necessary to allow adequate time to analyze, prepare and submit the four separate reports.

The balance of the Agencies recommendations we have adopted into the plan. The agency correspondence is enclosed as part of the plan.

If you have any questions concerning the plan, please call me at the North American Hydro offices @ 920-293-4628 ext. 14.

Sincerely,

North American Hydro, Inc.

Scott Klabunde
Regulatory Manager

cc: Ms. Peggy Harding, FERC CRO
Mr. Jeffrey Scheirer, WDNR
Ms. Janet Smith, USFWS

ORIGINAL

Water Quality Monitoring Plan

Per License Article 408

for the

Flambeau (Upper) Hydroelectric Project
FERC Project # 2640
Flambeau Hydro, LLC

Flambeau River, Price County, Wisconsin

April, 2003

Respectfully Submitted By:

NORTH AMERICAN HYDRO

Owners • Operators • Products • Services
116 State Street - P.O. Box 167
Neshkoro, Wisconsin 54960
(920) 293-4628 • Fax: (920) 293-8087

Water Quality Monitoring Plan

Per License Article 408

for the

Flambeau (Upper) Hydroelectric Project
FERC Project # 2640
Flambeau Hydro, LLC

Flambeau River, Price County, Wisconsin

Submitted By:
North American Hydro, Incorporated
116 North State Street
Neshkoro, Wisconsin 54960

April, 2003

Introduction

This Water Quality Monitoring Plan for the Flambeau (Upper) Hydroelectric Project, FERC Project # 2640, City of Park Falls, Price County, Wisconsin has been written in generic terms in order to encompass technological advancements and potential agency personnel changes during the 39-year term of license. Therefore, current equipment manufacturers, equipment model specifications and reference to specific Wisconsin Department of Natural Resources (WDNR), United States Department of the Interior – Fish and Wildlife Service (USFWS) and Federal Energy Regulatory Commission (FERC) agency personnel have purposely been excluded from this plan.

The licensee will periodically refine the Water Quality Monitoring Plan in consultation with the WDNR and the USFWS. The Plan refinement will specify the sampling equipment that will be used during the sampling events, any Commission approved Plan changes, and the specific agency personnel to whom data and report submissions will be sent. The Plan refinement will be submitted in the form of an addendum to the Water Quality Monitoring Plan and distributed to all designated agency personnel.

WDNR requested, during the July 11, 2002 WDNR/USFWS consultation meeting, that clarification be added to this plan regarding which WDNR approved Secchi Disk sampling procedure would be used for all Plan sampling events. Appendix A has been added to this Plan outlining the WDNR Secchi Disk sampling procedures that will be followed during all Plan sampling events. WDNR additionally requested a color sampling parameter added to the Water Quality Monitoring Plan. Due to the minimal additional time requirement required to sample this parameter and the relatively low laboratory fees for analysis, this requested parameter has been included in this Plan.

Water Quality Monitoring Plan
Per License Article 408

for the

Flambeau (Upper) Hydroelectric Project
FERC Project # 2640
Flambeau Hydro, LLC

Flambeau River, Price County, Wisconsin

Requirement for Studies

The Federal Energy Regulatory Commission (FERC), has stipulated as a requirement of the Flambeau (Upper) Hydroelectric Project License (Article 408), issued February 5, 1997, that "the licensee shall, after consultation with the Wisconsin Department of Natural Resources (Wisconsin DNR) file with the Commission, for approval, a plan to monitor: (1) water clarity; (2) phosphorus; (3) chlorophyll a; (4) water temperature; and (5) dissolved oxygen in the Upper Project impoundment monthly from June 1 through August 31.

The monitoring plan shall include a schedule for: (1.) implementation of the program; (2) consultation with the Wisconsin DNR concerning the results of the monitoring; and (3) filing the results, agency comments, and licensee's response to agency comments with the Commission.

The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agency, and specific descriptions of how the agency's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agency to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission."

The Commission's May 4, 1998 "Order on Hearing of Orders Issuing New Licenses and Orders Issuing Subsequent Licenses" modified Article 408, at the request of the Wisconsin Department of Natural Resources, to require sampling at "iceout" in March or April and monthly in July and August.

Purpose of Studies

The purpose of these water quality studies shall be to establish a long-term database of water quality measurements in order to document the tropic state, dissolved oxygen concentration and any stratification of the Flambeau (Upper) Project impoundment at the time and location of sampling events.

Study Sampling Periods

The Wisconsin Department of Natural Resources has requested that annual water quality sampling studies consist of one grab sampling event during Spring "iceout", one grab sampling event during the month of July, and one grab sampling event during the month of August at one WDNR approved sampling location on the Project impoundment.

Each water quality sampling study shall consist of three (3) sampling events each year. One (1) grab sampling event will be conducted during the Spring "iceout" of the Flambeau (Upper) Project impoundment. ("Iceout" shall be defined as the 14-day period following the breakup or melting of impoundment surface ice, resulting in the continuous exposure of 95% or more ice-free impoundment surface area). One (1) grab sampling event will be conducted during the month of July. One (1) grab sampling event will be conducted during the month of August. July and August sampling will be scheduled to provide at least 21 days separation between events.

Water quality sampling studies will be conducted each year following Commission approval of this Plan through the term of the license.

Sampling Event Design

Monitoring Parameters:

1. Water Clarity
2. Phosphorus
3. Chlorophyll a
4. Water Temperature
5. Dissolved Oxygen Concentration
6. True Color

Sampling Protocol

Prior to initial water quality study implementation, a reconnaissance of the impoundment will be performed to establish one (1) permanent sampling location that is representative of the maximum depth in the impoundment's main channel area and which can be easily located during subsequent sampling events and studies.

Access to the sampling location will be accomplished using a boat. Sampling personnel will carefully approach the established sampling location in order to mitigate any disruption within the water column at the sampling location. Sampling personnel will carefully deploy one or more anchor(s), minimizing any disruption of the water column or bottom sediments, in order to secure the boat over the established sampling location.

Sampling equipment will be cleaned and decontaminated with distilled water and, if appropriate, calibrated prior to sampling. Single-use laboratory sample containers and media will be obtained from the Wisconsin State Certified Laboratory selected to perform sample analysis or a reputable laboratory supply company.

Sampling personnel will complete a pre-printed customized Impoundment Sampling Log form to manually record sampling data and other pertinent information regarding each sampling event. Field sample handling procedures will be consistent with methods outlined in "Standard Methods for the Examination of Water and Wastewater", 20th Edition (1998).[1]

Water clarity per sampling event will be measured visually within one tenth (0.1) foot tolerance by sampling personnel employing a Secchi disk. Sampling personnel will record resulting Secchi disk time and depth data on the Impoundment Sampling Log form.

Two (2) Phosphorus grab samples per sampling event will be collected using a horizontal water sampler. One (1) sample will be collected three (3) feet below the impoundment's surface and one (1) sample will be collected three (3) feet above the impoundment's bottom. Each sample will be transferred to an appropriate sample container, preserved, appropriately labeled, and the container stored on ice in a

portable cooler for laboratory analysis. Sampling personnel will record collection times and sample preservation verification on the Impoundment Sampling Log form.

One (1) Chlorophyll a grab sample per sampling event will be obtained from water collected three (3) feet below the impoundment's surface using a horizontal water sampler. Water clarity will be calculated to determine the proper quantity of collected water to be filtered based on the following Secchi disk depth results:

Secchi Depth (in feet)	Water to filter (in ml)
Less than 1 foot	50
1.00 to 1.50 feet	100
1.50 to 2.25 feet	200
2.25 to 3.25 feet	300
3.25 to 6.00 feet	500
6.00 to 9.75 feet	800
9.75 to 16.50 feet	1000
Greater than 16.5 feet	1500

Collected water will be measured and filtered if required by the selected Wisconsin State Certified Laboratory providing analytical analysis. The sample will be transferred to an appropriate sample container, appropriately labeled, and the container stored on ice in a portable cooler for laboratory analysis. Sampling personnel will record the collection time and water sample quantity in the appropriate areas on the Impoundment Sampling Log form.

Water temperature will be sampled at three (3) foot vertical intervals from the surface to the bottom of the sample location water column per sampling event. Additionally, one (1) sample will be measured one half (0.5) foot below the impoundment surface and one (1) sample will be measured one half (0.5) foot above the bottom of the impoundment at the sample location. In the event that measured D.O. drops below the State minimum standard of 5.0 mg/l, sampling personnel will determine the water temperature at which 5.0 mg/l occurs. Water temperature sampling will be measured at (1) foot vertical intervals in the water column where measured D.O. falls below 5.0 mg/l. Sampling personnel will record resulting sample data in appropriate areas on the Impoundment Sampling Log form.

Dissolved Oxygen (D.O.) concentration will be sampled at three (3) foot vertical intervals from the surface to the bottom of the sample location water column per sampling event. Additionally, one (1) sample will be measured one half (0.5) foot below the impoundment surface and one (1) sample will be measured one half (0.5) foot above the bottom of the impoundment at the sample location. In the event that measured D.O. drops below the State minimum standard of 5.0 mg/l, sampling personnel will determine the depth at which 5.0 mg/l occurs. D.O. sampling will be measured at (1) foot vertical intervals in the water column where measured D.O. falls below 5.0 mg/l. Sampling personnel will record resulting sample data in appropriate areas on the Impoundment Sampling Log form.

One (1) True Color grab sample per sampling event will be obtained from water collected three (3) feet below the impoundment's surface using a horizontal water sampler. The sample will be transferred to an appropriate sample container, appropriately labeled, and the container stored on ice in a portable cooler for laboratory analysis. Sampling personnel will record the collection time and water sample quantity on the Impoundment Sampling Log form.

Sampling personnel will deliver and/or ship Phosphorus, Chlorophyll a and True Color samples, observing accepted handling and chain-of-custody methods, to a selected Wisconsin State Certified Laboratory at the conclusion of sampling activities for the sample event.

Sampling Event Coordination:

The Flambeau (Upper) Hydroelectric Project is the first in a downstream series of four hydroelectric Projects owned by Flambeau Hydro, LLC occurring on the Flambeau River North Fork). All four FERC issued hydroelectric Project licenses (Flambeau (Upper) – FERC # 2640, Flambeau (Lower) – FERC # 2421, Pixley – FERC # 2395, Crowley – FERC # 2473) specify identical water quality monitoring requirements. The licensee will coordinate sampling events for each of these four Projects to occur on the same day in an upstream to downstream Project sequence to provide cross-comparable water quality data.

Sampling Event Submissions:

Collected data from impoundment sampling events will be returned to North American Hydro, Incorporated's (NAH) corporate headquarters for analysis and electronic or optical storage. Compiled data files will be imported into a computer program or customized spreadsheet document for data analysis and graphing.

During the first two (2) years following Commission approval of this Plan and for two (2) years following FERC's approval of any license transfer, the licensee will forward copies of the laboratory analysis report and Impoundment Sampling Log for each sampling event to the designated WDNR and USFWS representatives for review and comment. The WDNR and USFWS representatives will mail NAH any comments regarding needs or concerns on submitted data within thirty (30) days of receipt of the NAH furnished data.

Special Notifications:

WDNR and USFWS representatives will be notified verbally via telephone communication, with a written follow-up letter via United States Postal Service delivery upon request, of any of the following occurrences within 48 hours of discovery:

1. Dissolved Oxygen concentrations observed below the 5 mg/l minimum Wisconsin State Water Quality Standard
2. Conditions delaying or preventing sampling
3. Equipment loss or failure

Reports

Within ninety (90) days following NAH's receipt of the laboratory's August sampling analysis results, a draft report will be generated by NAH and forwarded to the designated WDNR and USFWS representatives for requested written comment. The WDNR and USFWS representatives will mail NAH any written comments to the draft report within thirty (30) days of receipt of the draft report from NAH.

If there is a substantive disagreement with the draft report, a joint meeting will be held between disagreeing parties within thirty (30) days of NAH's receipt of written comments from the disagreeing agency. Written resolution and/or a written matrix of any unresolved issue(s) may conclude the joint meeting.

Within sixty (60) days of receipt of the WDNR and USFWS representative's written comments to the draft report and conclusion of any requested joint meeting(s), NAH will generate and mail copies of the "Water Quality Sampling Report for the Flambeau (Upper) Hydroelectric Project – FERC Project # 2640" for the appropriate study year to designated WDNR, USFWS and FERC representatives.

The "Water Quality Sampling Report for the Flambeau (Upper) Hydroelectric Project – FERC Project # 2640" will include copies of the Impoundment Sampling Log forms, laboratory analysis reports, comparison graphs, licensee comments, and any agency comments.

References:

[1] APHA, AWWA, and WPCF, 1998. Standard Methods for the Examination of Water and Wastewater, 20th ed., American Public Health Association, Washington, D.C. USA. ISBN 0-87553-235-7

IMPOUNDMENT SAMPLING LOG FORM

IMPOUNDMENT SAMPLING LOG

2004 Water Quality Study - Flambeau (Upper) Hydroelectric Project - FERC #2640

Date: _____

Pre-Sampling Data:

Time: _____ Barometer: _____ Air Temp: _____ °C Wind Speed: _____

Sky Conditions: _____

Precipitation within Last 24 Hours: _____

D.O. Meter Calibration: Instrument Model Used: _____

D.O. Membrane Changed in Last 24 Hours? ☐ Yes ☐ No If Yes, Time Changed: _____

Battery Status: _____ volts

Calibration Time: _____ Method: _____ (Air, Winkler Titration, Saturated Water)

Sampling Depth Profile: Measured Depth to Bottom of the Impoundment: _____ feet

Secchi Disk Depth: (±0.1 foot):_____feet. Time: _____

Chlorophyll a (3 feet below surface)

Time	Quantity (ml)	Filtered

Chlorophyll a Water to Sample

Secchi Depth	Water to Filter (in ml)	Secchi Depth	Water to Filter (in ml)
< 1.00 foot	50	3.25 <> 6.00 feet	500
1.00 <> 1.50 feet	100	6.00 <> 9.75 feet	800
1.50 <> 2.25 feet	200	9.75 <> 16.50 feet	1000
2.25 <> 3.25 feet	300	> 16.50 feet	1500

D.O. Sample Data

Depth	Time	D.O. (mg/l)	°C
0.5 feet below surface			
3 feet			
6 feet			
9 feet			
12 feet			
15 feet			
18 feet			
21 feet			
24 feet			
0.5 feet above bottom			

Color (3 feet below surface)

Time	Quantity (ml)

Phosphorous

Sample 1 (3 feet below surface)

Time	Preserved ?

Sample 2 (3 feet above bottom)

Time	Preserved ?

Comments: _____

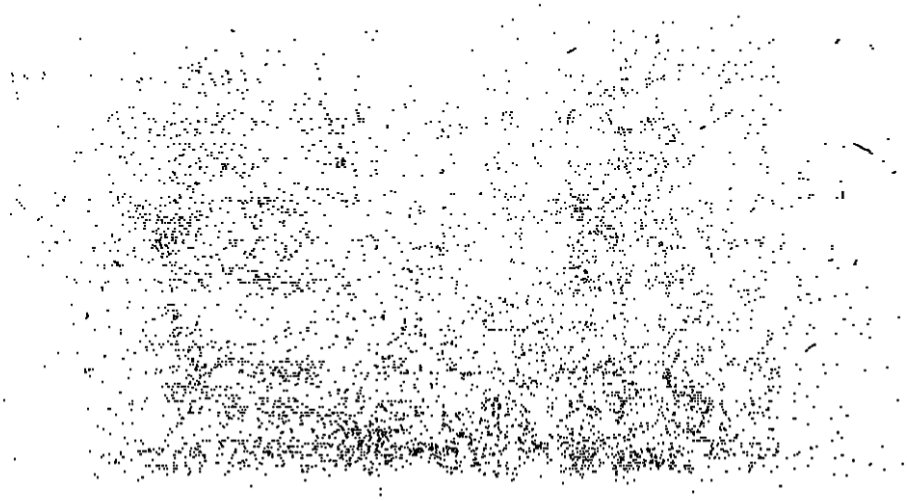
_____

_____

_____

Performed By: _____ _____

SAMPLE LOCATION MAP



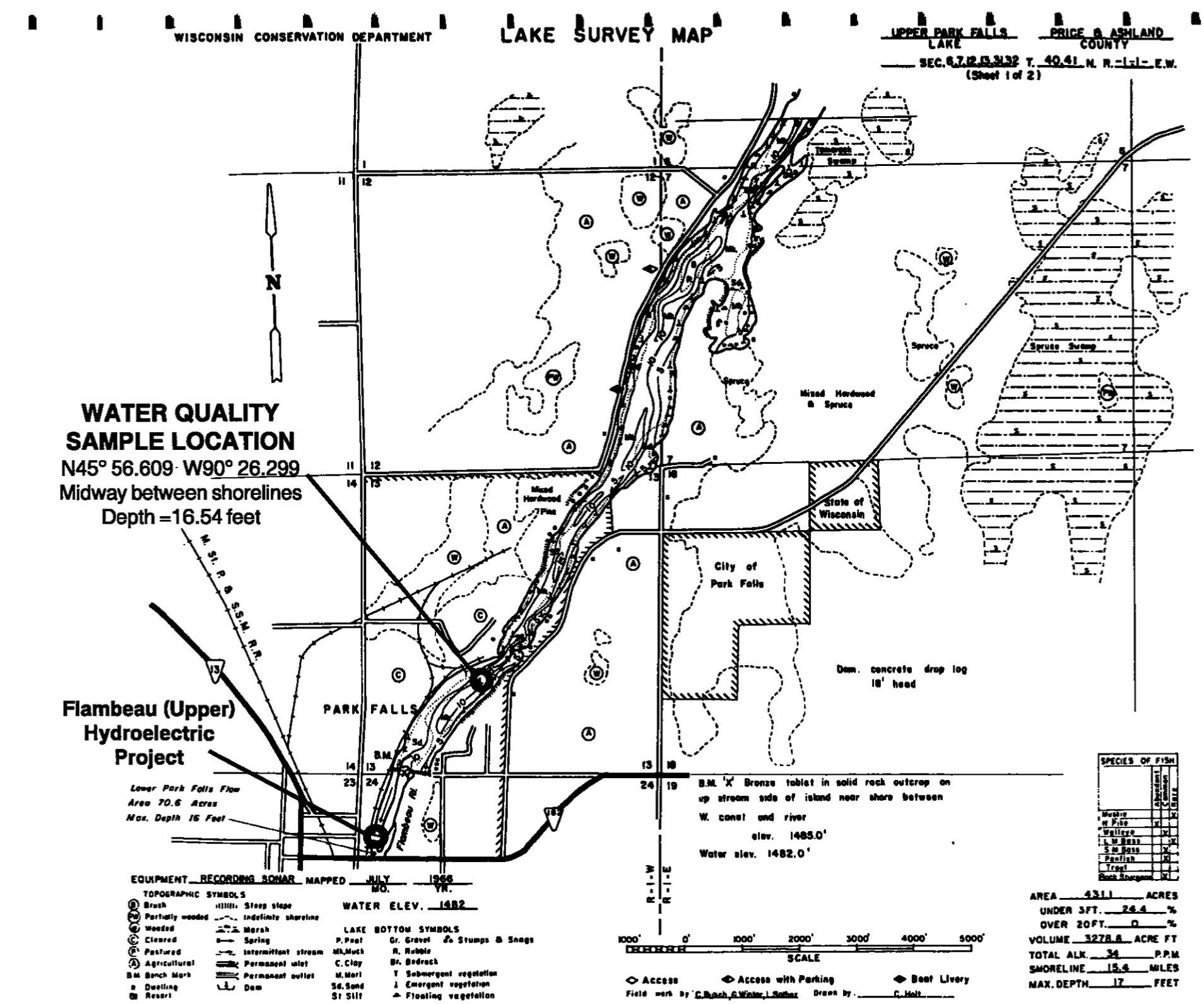
WISCONSIN CONSERVATION DEPARTMENT

LAKE SURVEY MAP

UPPER PARK FALLS LAKE — PRICE & ASHLAND COUNTY

SEC. 6,7,12,13,31,32 T. 40,41 N. R. -1-1- E.W.

(Sheet 1 of 2)



SPECIES OF FISH	Abundant	Present in Area
Muskie		X
W. Pike	X	
Walleye		X
L.M. Bass		X
S.M. Bass		X
Panfish		X
Trout		
Rock Sturgeon		X

AREA 4311 ACRES
UNDER 3FT. 24.4 %
OVER 20FT. 0 %
VOLUME 3278.8 ACRE FT
TOTAL ALK. 34 P.P.M.
SHORELINE 15.4 MILES
MAX. DEPTH 17 FEET

EQUIPMENT RECORDING SONAR MAPPED JULY MO. 1966 YR.

WATER ELEV. 1482

TOPOGRAPHIC SYMBOLS

- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- Resort
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam

LAKE BOTTOM SYMBOLS

- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- St Silt
- Gr. Gravel
- Stumps & Snags
- R. Rubble
- Br. Bedrock
- Submergent vegetation
- Emergent vegetation
- Floating vegetation

Field work by C. Busch, G. Winter, I. Sather Drawn by C. Holt

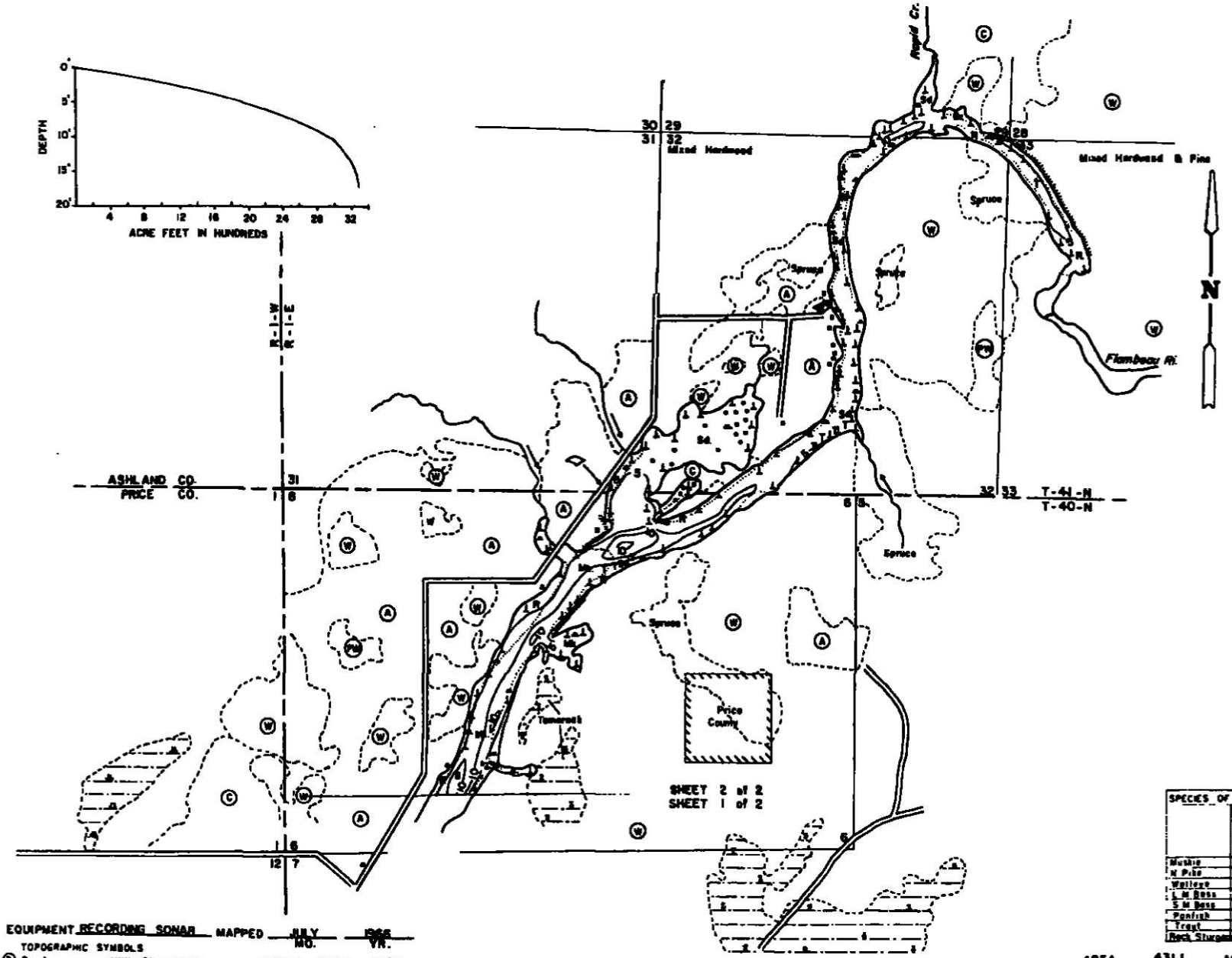
WISCONSIN CONSERVATION DEPARTMENT

LAKE SURVEY MAP

UPPER PARK FALLS LAKE — PRICE & ASHLAND COUNTY

SEC. 6,7,12,13,31,32 T. 40,41 N. R. 1-I- E.W.

(Sheet 2 of 2)



EQUIPMENT RECORDING SONAR MAPPED JULY 1966
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- Steep slope
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- Sd. Sand
- St Silt
- Gr. Gravel
- Stumps
- Snags
- R. Rubble
- Br. Bedrock
- Submergent vegetation
- Emergent vegetation
- Floating vegetation

1000' 0' 1000' 2000' 3000' 4000' 5000'
SCALE

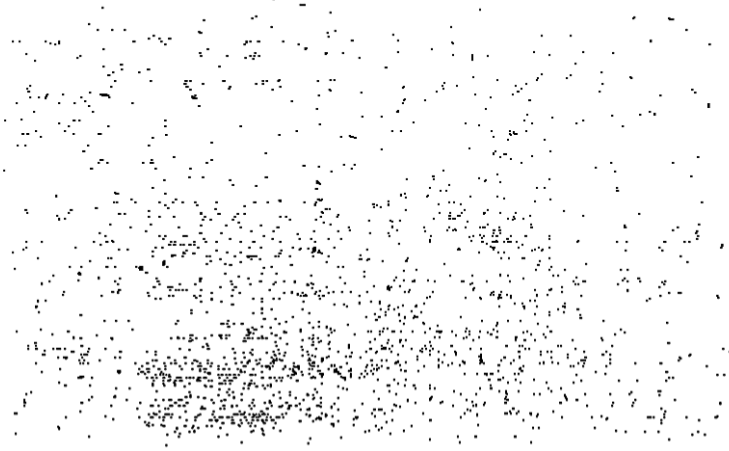
◇ Access ◆ Access with Parking ◆ Boat Livery

Field work by C.Busch, G.Wintz, L.Sather Drawn by .... C. Holt

SPECIES OF FISH	Abundant	Common	Few
Muskie			X
N. Pike	X		
Walleye	X		
L.M. Bass			X
S.M. Bass	X		
Panfish	X		
Trout			
Rock Sturgeon			X

AREA 431.1 ACRES
UNDER 3FT. 24.4 %
OVER 20FT. 0 %
VOLUME 3278.8 ACRE FT.
TOTAL ALK. 34 P.P.M.
SHORELINE 15.4 MILES
MAX. DEPTH 17 FEET

SAMPLING DATA FORMATS FURNISHED FOR REPORTS



IMPOUNDMENT SAMPLING LOG

2002 Water Quality Study - Flambeau (Upper) Hydroelectric Project - FERC #2640

Date: August 28, 2002

Pre-Sampling Data:

Time: 7:45 AM Barometer: 30.30 IN Air Temp: 16 °C Wind Speed: SE 3 MPH

Sky Conditions: SUNNY W/ VERY THIN CIRRUS

Precipitation within Last 24 Hours: NONE

D.O. Meter Calibration: Instrument Model Used: YSI MODEL 51B W/5739 PROBE (STANDARD MEMBRANE)

D.O. Membrane Changed in Last 24 Hours? ☐ Yes ☆ No If Yes, Time Changed: _____

Battery Status: 1.597 volts

Calibration Time: 8:15 AM Method: AIR (Air, Winkler Titration, Saturated Water)

Sampling Depth Profile: Measured Depth to Bottom of the Impoundment: 16.70 feet

Secchi Disk Depth: (+/- 0.1 foot): 5.42 feet. Time: 8:20 AM

Chlorophyll a Sampling (3 feet below surface)

8:27 AM	2000 ML (UNFILTERED)

Chlorophyll a Water to Sample

<1.00 foot	50	3.25 <> 6.00 feet	500
1.00 <> 1.50 feet	100	6.00 <> 9.75 feet	800
1.50 <> 2.25 feet	200	9.75 <> 16.50 feet	1000
2.25 <> 3.25 feet	300	> 16.50 feet	1500

D.O. Sample Data

0.5 feet below surface	8:40 AM	6.95	21.9
3 feet	8:42 AM	6.85	21.9
6 feet	8:43 AM	6.80	22.0
9 feet	8:45 AM	6.80	22.0
12 feet	8:46 AM	6.80	21.9
15 feet	8:48 AM	6.79	21.9
18 feet			
21 feet			
24 feet			
0.5 feet above bottom	8:49 AM	6.78	21.9

Phosphorous Samplings

Sample 1
(3 feet below surface)

8:31 AM	H_2SO_4

Sample 2
(3 feet above bottom)

8:35 AM	H_2SO_4

Comments: DEWPOINT: 14°C, HUMIDITY: 88%
COLOR SAMPLE TAKEN @ 8:23 AM @ 3 FEET BELOW SURFACE
SAMPLE LOCATION: N45° 56.609' W90° 26.299' (±22 FEET)

Performed By: Steven R. Loeffler STEVEN R. LOEFFLER

Flambeau Projects Operations Log Data

Water Quality Monitoring Study

August 28, 2002

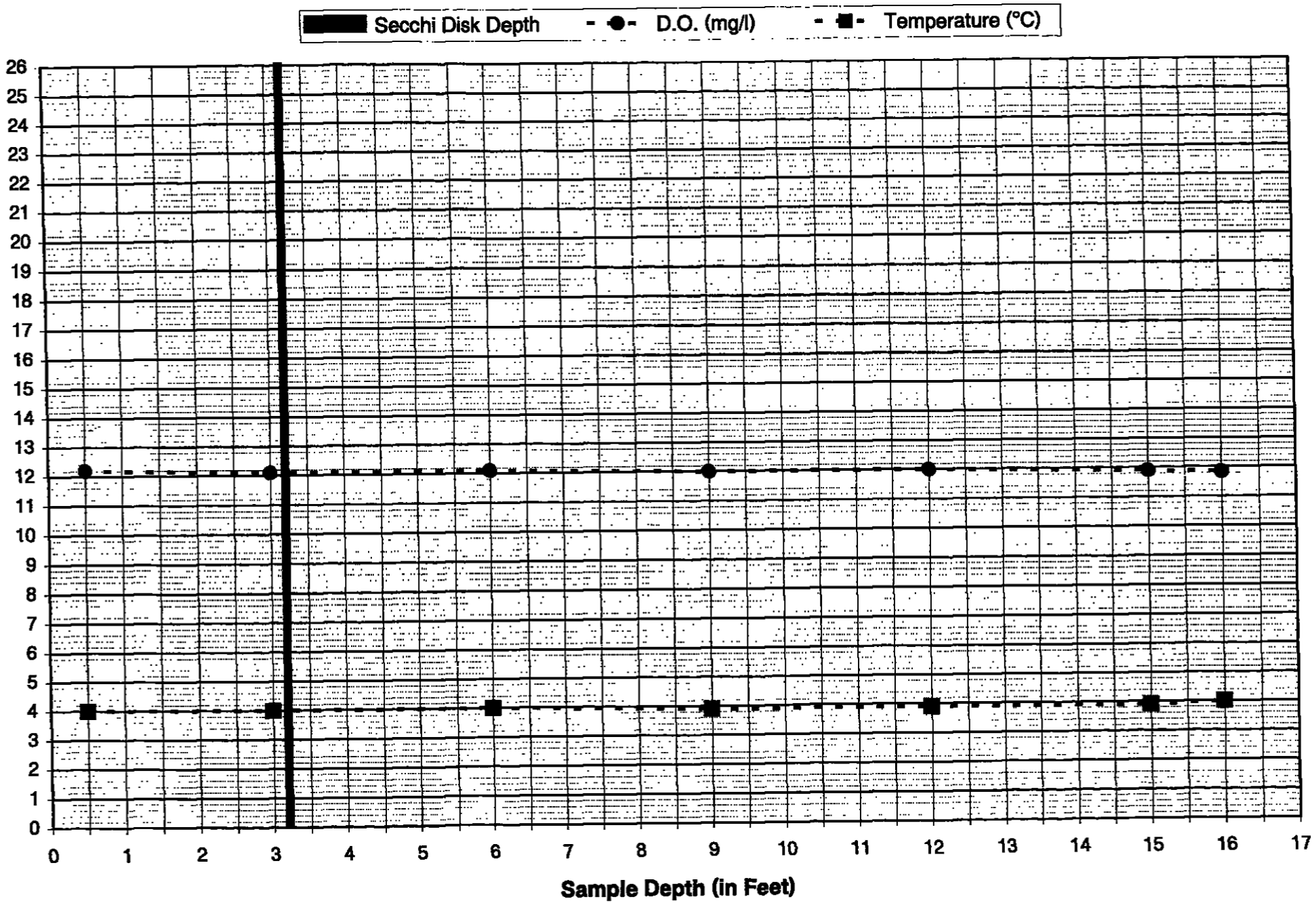
Project	Total CFS	Gate CFS	Unit CFS			Unit KW			Impoundment (NGVD)	Tailwater (NGVD)	Head (Feet)
			Unit #1	Unit #2	N/A	Unit #1	Unit #2	N/A			
UPPER	699	50	346	303		8404	7341		1486.6	1467.5	19
			Enter 24 Hour Totals For KW Here >								
			Unit #2	Unit #3	Unit #4	Unit #2	Unit #3	Unit #4			
LOWER	716	0	230	256	230	4600	0	6900	1467.3	1448.8	18.7
			Enter 24 Hour Totals For KW Here >								
			Unit #5	Unit #6	N/A	Unit #5	Unit #6	N/A			
PIXLEY	794	0	186	608		4600	15000		1448.1	1427.8	20.3
			Enter 24 Hour Totals For KW Here >								
			Unit #8	Unit #9	N/A	Unit #8	Unit #9	N/A			
CROWLEY	909	0	909	0		17000	0		1427.4	1406.0	21.4
			Enter 24 Hour Totals For KW Here >								

Data Entered in These Fields ONLY!

Spreadsheet Calculated Fields

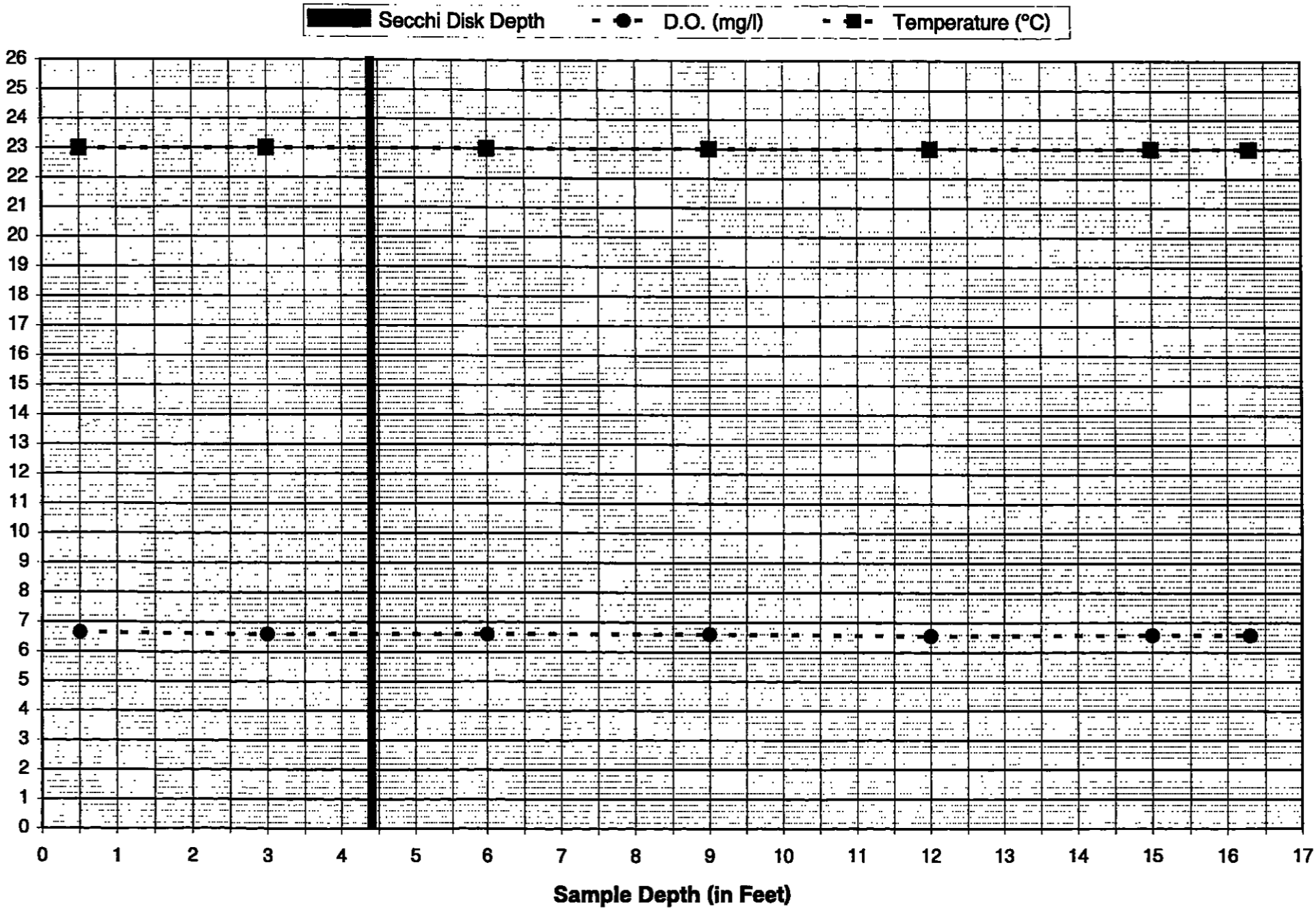
Upper (Flambeau) Impoundment - FERC #2640

April 16, 2002 (*Iceout*) Sampling Event



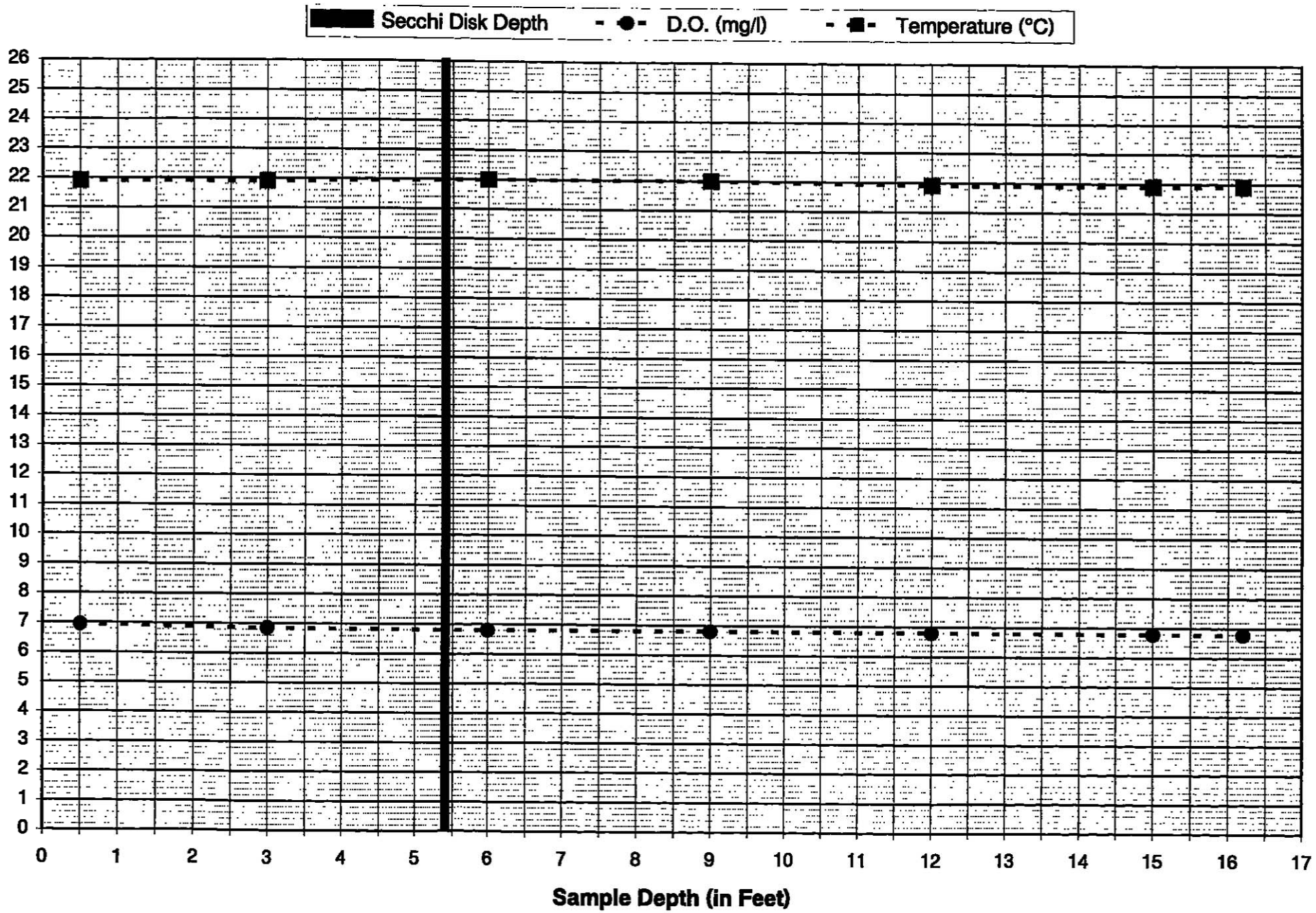
Upper (Flambeau) Impoundment - FERC #2640

July 24, 2002 Sampling Event



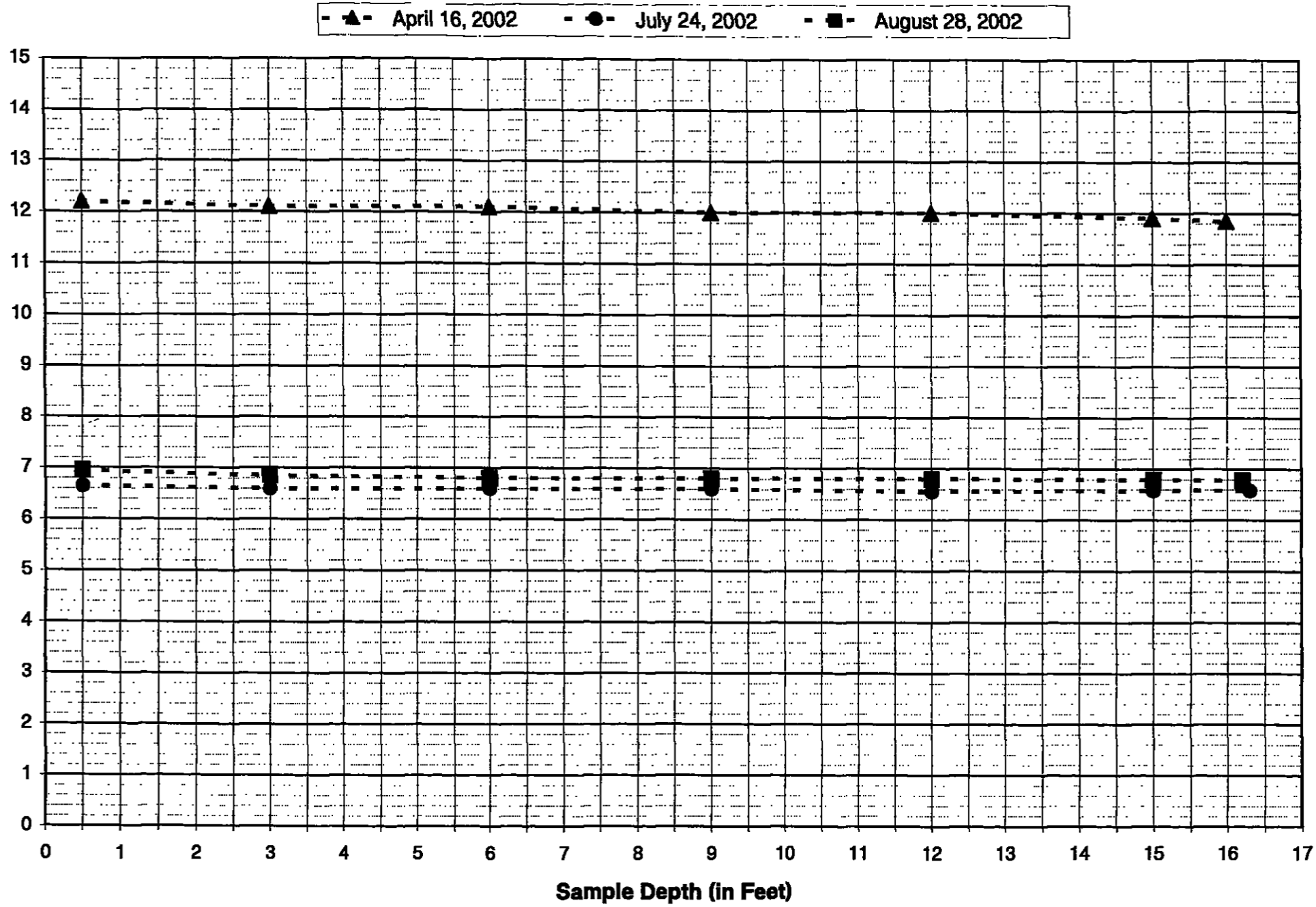
Upper (Flambeau) Impoundment - FERC #2640

August 28, 2002 Sampling Event



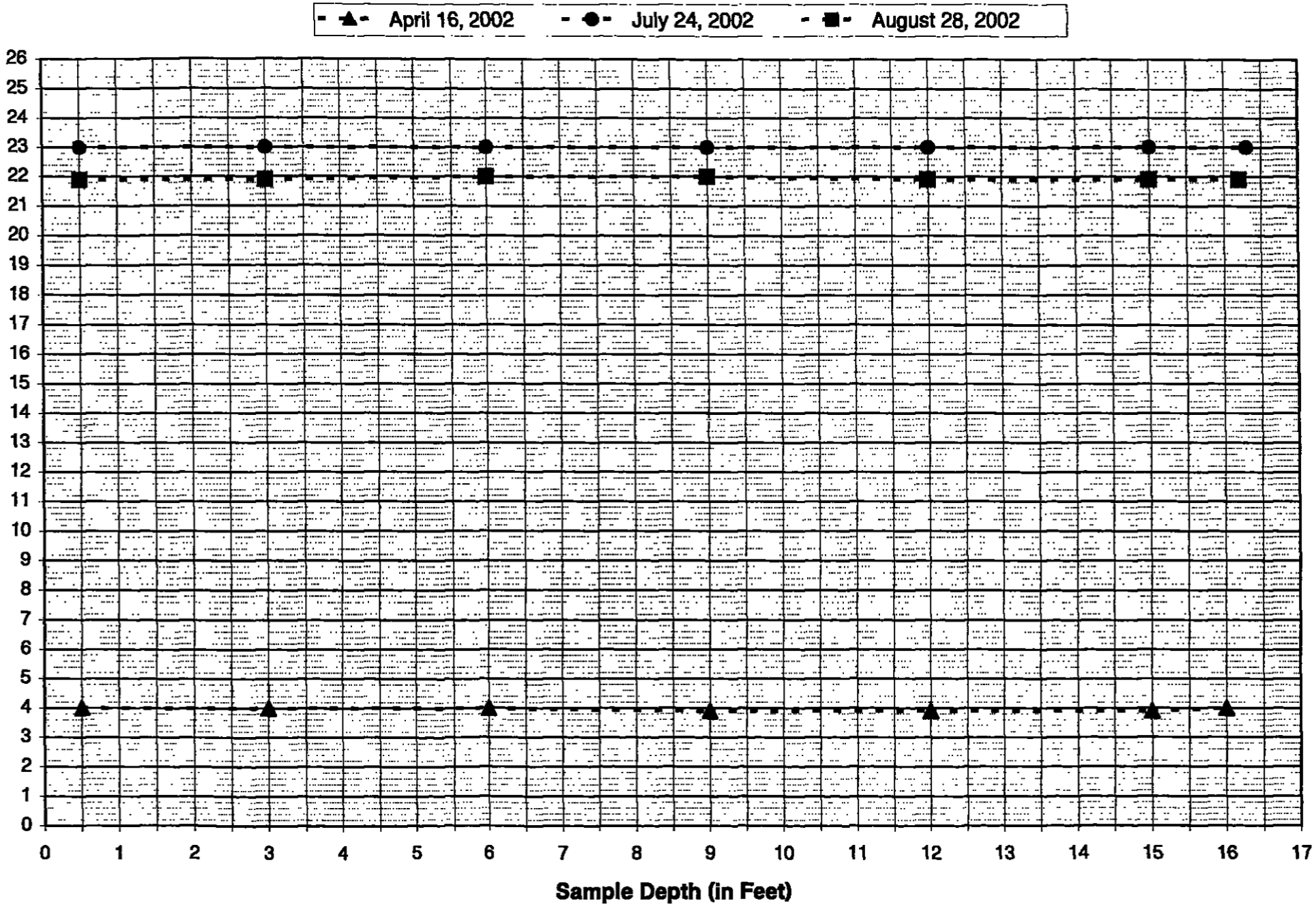
Upper (Flambeau) Impoundment - FERC #2640

2002 Dissolved Oxygen Samples



Upper (Flambeau) Impoundment - FERC #2640

2002 Temperature Samples



REQUEST FOR SERVICES USFilter

ENVIROSCAN SERVICES 301 W. MILITARY RD. ROTHSCHILD, WI 54474 1-800-338-SCAN

REPORT TO:
Name: STEVEN LOEFFLER
Company: NORTH AMERICAN HYDRO, INC.
Address: 116 STATE ST. - P.O. BOX 167
NESHKORO, WISCONSIN 54960
Phone: (920) 293-4628 EXT. 15
P. O. #
Project # FLAMBEAU RIVER Quote # 7246
Location PRICE CO., WI E-3-4-12

BILL TO: (if different from Report To info)
Name: —
Company: NORTH AMERICAN HYDRO, INC.
Address: 116 STATE STREET - P.O. BOX 167
NESHKORO, WISCONSIN 54960
Phone: (920) 293-4628

Sample Type
(Check all that apply)
- ☐ Groundwater
- ☐ Wastewater
- ☐ Soil/Solid
- ☐ Drinking Water
- ☐ Oil
- ☐ Vapor
- ☒ Other RIVER WATER

Turnaround Time
- ☒ Normal
- ☐ Rush (Pre-approved by Lab)

Date Needed
Approved By

ANALYTICAL REQUESTS
(use separate sheet if necessary)

DATE	TIME	No. of Containers COMP	No. of Containers GRAB	SAMPLE ID	PHOSPHORUS (LOW)					REMARKS
8-28-02	8:31A		1	1A	X					1-1L soy each
	8:35A		1	1B	X					
	10:51A		1	2A	X					
	10:57A		1	2B	X					
	1:24P		1	3A	X					
	1:28P		1	3B	X					
	5:28P		1	4A	X					
	5:32P		1	4B	X					
			1	TEMP BLANK						TEMP BLANK

[redacted]

CHAIN OF CUSTODY RECORD

SAMPLERS: *(Signature)* Steven R. Loeffler

RELINQUISHED BY: *(Signature)*	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: *(Signature)*	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: *(Signature)* Steven R. Loeffler	DATE/TIME 08-29-02 4:03P	[redacted]

Comments: ALL SAMPLES ON ICE SINCE SAMPLED

REQUEST FOR SERVICES USFilter

ENVIROSCAN SERVICES 301 W. MILITARY RD. ROTHSCHILD, WI 54474 1-800-338-SCAN

REPORT TO:
Name: STEVEN LOEFFLER
Company: NORTH AMERICAN HYDRO, INC.
Address: 116 STATE ST. - P.O. BOX 167
NESHKORO, WISCONSIN 54960
Phone: (920) 293-4628 EXT. 15
P. O. #
Project # FLAMBEAU RIVER Quote #
Location PRICE CO., WI

BILL TO: (if different from Report To info)
Name: —
Company: NORTH AMERICAN HYDRO, INC.
Address: 116 STATE STREET - P.O. BOX 167
NESHKORO, WISCONSIN 54960
Phone: (920) 293-4628

Sample Type
(Check all that apply)
- ☐ Groundwater
- ☐ Wastewater
- ☐ Soil/Solid
- ☐ Drinking Water
- ☐ Oil
- ☐ Vapor
- ☒ Other RIVER WATER

Turnaround Time
- ☒ Normal
- ☐ Rush (Pre-approved by Lab)

Date Needed
Approved By

ANALYTICAL REQUESTS
(use separate sheet if necessary)

DATE	TIME	No. of Containers COMP	No. of Containers GRAB	SAMPLE ID	CHLOROPHYLL A	COLOR (TRUE-APPARENT)				REMARKS
8-28-02	8:27A		1	1C	X					1-liter NP. pl. ea
	10:48A		1	2C	X					
	1:21P		1	3C	X					
	5:26P		1	4C	X					
8-28-02	8:23A		1	1D		X				
	10:45A		1	2D		X				
	1:18P		1	3D		X				
	5:22P		1	4D		X				

Comments: ALL SAMPLES ON ICE SINCE SAMPLED
Bruce S. informed color arrived

CHAIN OF CUSTODY RECORD

SAMPLERS: *(Signature)* Steven R. Loeffler

RELINQUISHED BY: *(Signature)*	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: *(Signature)*	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: *(Signature)* Steven R. Loeffler	DATE/TIME 08-29-02 4:03P	

USFilter

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

SEP - 9 2002

September 6, 2002

North American Hydro, Inc.
116 State Street
P.O. Box 167
Neshkoro, WI 54960

Attn: Steven Loeffler

REPORT NO.: 110313 **PROJECT NO.: FLAMBEAU RIV**

Please find enclosed the analytical report, including the Sample Summary, Sample Narrative and Chain of Custody for your sample set received August 29, 2002.

All analyses were performed in accordance with approved methods as indicated on this report.

If you have any questions about the results, please call. Thank you for using USFilter, Enviroscan Services for your analytical needs.

Sincerely,

USFilter, Enviroscan Services

Bruce M. Schertz
Inorganic Laboratory Supervisor

I certify that the data contained in this report has been generated and reviewed in accordance with the USFilter, Enviroscan Services Quality Assurance Program. Exceptions, if any, are discussed in the sample narrative. Samples will be retained for 30 days from the date of this report, then disposed in an appropriate manner. USFilter, Enviroscan Services reserves the right to return samples identified as hazardous. Release of this Final Report is authorized as verified by the following signature.

Approved by: James R. Sullivan Jr.

USFilter

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

Sample Summary

110313.2

Lab Id	Client Sample ID	Date/Time	Matrix
110313	1A	08/28/02 08:31	WATER
110314	1B	08/28/02 08:35	WATER
110315	2A	08/28/02 10:51	WATER
110316	2B	08/28/02 10:57	WATER
110317	3A	08/28/02 13:24	WATER
110318	3B	08/28/02 13:28	WATER
110319	4A	08/28/02 17:28	WATER
110320	4B	08/28/02 17:32	WATER
110321	1C	08/28/02 08:27	WATER
110322	2C	08/28/02 10:48	WATER
110323	3C	08/28/02 13:21	WATER
110324	4C	08/28/02 17:26	WATER
110325	1D	08/28/02 08:23	WATER
110326	2D	08/28/02 10:45	WATER
110327	3D	08/28/02 13:18	WATER
110328	4D	08/28/02 17:22	WATER

Sample Narrative/Sample Status

LOGIN:

GENERAL:

ANALYSES:

QA/QC:

REPORTING:

Definitions

LOD = Limit of Detection
LOQ = Limit of Quantitation
< = Less Than
COMP = Complete
SUBCON = Subcontracted analysis
mv = millivolts
pCi/l = picocurie per liter
ml/l = milliliters/Liter

µg/l = Micrograms per liter = parts per billion (ppb)
µg/kg = Micrograms per kilogram = parts per billion (ppb)
mg/l = Milligrams per liter = parts per million (ppm)
mg/kg = Milligrams per kilogram = parts per million (ppm)
NOT PRES = Not Present
ppth = Parts per thousand
(S) = Surrogate Compound

USFilter

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

North American Hydro, Inc.
116 State Street
P.O. Box 167
Neshkoro, WI 54960

Attn: Steven Loeffler

PROJECT NO.: FLAMBEAU RIV
REPORT NO. : 110313.3
DATE REC'D : 08/29/02
REPORT DATE: 09/06/02
PREPARED BY: BMS

Sample ID: 1A Matrix: WATER Sample Date/Time: 08/28/02 08:31 Lab No. 110313

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.05	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 1B Matrix: WATER Sample Date/Time: 08/28/02 08:35 Lab No. 110314

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.07	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 2A Matrix: WATER Sample Date/Time: 08/28/02 10:51 Lab No. 110315

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.06	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 2B Matrix: WATER Sample Date/Time: 08/28/02 10:57 Lab No. 110316

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.06	mg/l	0.02	0.0666	1		09/04/02	GAG

USFilter

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

North American Hydro, Inc.
116 State Street
P.O. Box 167
Neshkoro, WI 54960

Attn: Steven Loeffler

PROJECT NO.: FLAMBEAU RIV
REPORT NO. : 110313.4
DATE REC'D : 08/29/02
REPORT DATE: 09/06/02
PREPARED BY: BMS

Sample ID: 3A **Matrix: WATER** **Sample Date/Time: 08/28/02 13:24** **Lab No. 110317**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.07	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 3B **Matrix: WATER** **Sample Date/Time: 08/28/02 13:28** **Lab No. 110318**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.06	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 4A **Matrix: WATER** **Sample Date/Time: 08/28/02 17:28** **Lab No. 110319**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.31	mg/l	0.02	0.0666	1		09/04/02	GAG

Sample ID: 4B **Matrix: WATER** **Sample Date/Time: 08/28/02 17:32** **Lab No. 110320**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 365.4								
Total Phosphorus Low Level	0.07	mg/l	0.02	0.0666	1		09/04/02	GAG

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ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

North American Hydro, Inc.
116 State Street
P.O. Box 167
Neshkoro, WI 54960

Attn: Steven Loeffler

PROJECT NO.: FLAMBEAU RIV
REPORT NO. : 110313.5
DATE REC'D : 08/29/02
REPORT DATE: 09/06/02
PREPARED BY: BMS

Sample ID: 1C **Matrix: WATER** **Sample Date/Time: 08/28/02 08:27** **Lab No. 110321**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
SM 10200H								
Chlorophyll a	5.34	µg/l	-	0.1	-		09/06/02	LCK

Sample ID: 2C **Matrix: WATER** **Sample Date/Time: 08/28/02 10:48** **Lab No. 110322**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
SM 10200H								
Chlorophyll a	5.87	µg/l	-	0.1	-		09/06/02	LCK

Sample ID: 3C **Matrix: WATER** **Sample Date/Time: 08/28/02 13:21** **Lab No. 110323**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
SM 10200H								
Chlorophyll a	13.4	µg/l	-	0.1	-		09/06/02	LCK

Sample ID: 4C **Matrix: WATER** **Sample Date/Time: 08/28/02 17:26** **Lab No. 110324**

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
SM 10200H								
Chlorophyll a	15.0	µg/l	-	0.1	-		09/06/02	LCK

All Analyses conducted in accordance with USFilter Quality Assurance Program
Wisconsin Lab Certification No. 737053130

a VIVENDI water company

USFilter

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221

North American Hydro, Inc.
116 State Street
P.O. Box 167
Neshkoro, WI 54960

Attn: Steven Loeffler

PROJECT NO.: FLAMBEAU RIV
REPORT NO. : 110313.6
DATE REC'D : 08/29/02
REPORT DATE: 09/06/02
PREPARED BY: BMS

Sample ID: 1D | Matrix: WATER | Sample Date/Time: 08/28/02 08:23 | Lab No. 110325

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 110.2								
App. Color	50.0	APHA	-	5.0	-		08/30/02	LMV
True Color	35.0	APHA	-	5.0	-		08/30/02	LMV

Sample ID: 2D | Matrix: WATER | Sample Date/Time: 08/28/02 10:45 | Lab No. 110326

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 110.2								
App. Color	60.0	APHA	-	5.0	2		08/30/02	LMV
True Color	50.0	APHA	-	5.0	-		08/30/02	LMV

Sample ID: 3D | Matrix: WATER | Sample Date/Time: 08/28/02 13:18 | Lab No. 110327

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 110.2								
App. Color	70.0	APHA	-	5.0	2		08/30/02	LMV
True Color	50.0	APHA	-	5.0	-		08/30/02	LMV

Sample ID: 4D | Matrix: WATER | Sample Date/Time: 08/28/02 17:22 | Lab No. 110328

	Result	Units	LOD	LOQ	Dilution Factor	Qualifiers	Date Analyzed	Analyst
EPA 110.2								
App. Color	70.0	APHA	-	5.0	2		08/30/02	LMV
True Color	50.0	APHA	-	5.0	-		08/30/02	LMV

APPENDIX A

APPENDIX A

Secchi Disk Sampling Procedures

The following Secchi Disk sampling procedures have been adopted from Wisconsin Department of Natural Resources publication "Self-Help Lake Volunteer Training Manual". Additional information has been added to provide additional guidance and clarification for the sampling process.

All Secchi disk samplings at a specific sampling site should be taken with the sun at approximately the same elevation in the sky during each sampling, providing similar viewing conditions per sampling event. In other words, if a sample is taken with sun at approximately 30 degrees above the horizon on June 21, sampling on November 15 should be taken with the sun positioned at the approximately the same elevation above the horizon.

Sampling should not be taken immediately following significant weather that may influence the Secchi Disk reading. High winds and precipitation induced high stream flows can result in lower water visibility due to increased sediments in the sampled water column. Allow at least 24 hours following a return to historically "normal" conditions for the period before resuming sampling.

Required items for sampling:

Item	Qty	Comments
20cm Secchi Disk	**1**	including any weighting devices
Secchi Disk rope	**1**	50 feet of 1/8 inch non-stretch type
Measuring clips	**4**	clips that temporarily and securely attach to rope (clothes pins, binder clips, etc.)
Tape measure	**1**	
Logging form	**1**	

Sampling Procedure:

1. If using a boat for sampling, anchor boat securely over the sampling site. The boat should be anchored in such a way to prevent the boat from altering position over the sampling site. (Note: An USCG approved flotation device should be worn during all sampling activities).

2. Remove sunglasses or glasses with photochromic lenses (lenses which darken when exposed to the ultraviolet radiation in sunlight) several minutes prior to sampling to allow the sampling person's eyes to adjust properly for sampling.

3. Prepare the Secchi disk for sampling, unwinding and arranging the Secchi disk rope in a manner sufficient to allow unrestricted sampling. Check the attachment of the Secchi disk rope to the Secchi disk to ensure it is secure and unencumbered. Check to confirm that marking clips are functioning properly

4. The sampling site's water surface must be shaded from direct sunlight exposure to mitigate surface reflection impairing the sampling person's subsurface view during Secchi disk sampling. Select a stance that safely positions the sampling person's face directly above the sample site and within 18 inches of the water's surface.

5. Slowly lower the Secchi disk into the water at the sampling site to the depth at which the disk can no longer be distinguished (disappears) from the surrounding water. With the Secchi disk located at this point, attach one of the marking clips to the Secchi disk rope at the water's surface.

6. Lower the Secchi disk approximately 1/2 meter and then slowly raise it toward the surface until the disk is just perceptible. With the Secchi disk located at this point, attach one of the marking clips to the Secchi disk rope at the water's surface. Retrieve the Secchi disk from the water.

7. Locate the point on the Secchi disk rope that is midway between the two marking clips. With the tape measure, measure the distance between this point on the rope, along the rope, to the top surface of the Secchi disk. Record this distance on the back of the log sheet or a notepad.

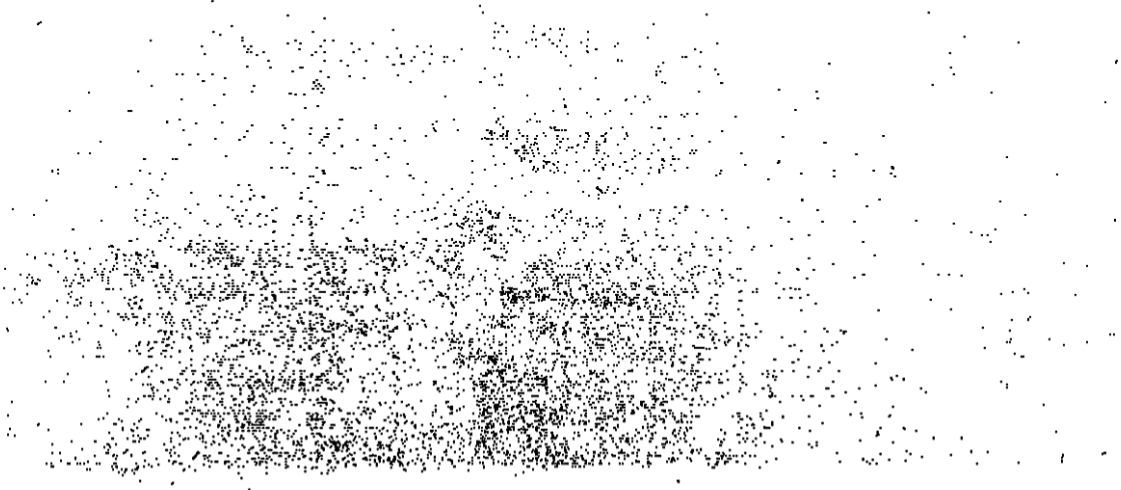
8. Repeat steps 5-7 two additional times.

9. Average the three recorded readings (add the three recorded distances together and divide the sum by three). Record the averaged result on the logging form as the Secchi Disk Depth. The sampling person should add any additional pertinent information in the Comments area on the logging form.

10. If monitoring more than one site, proceed to the next location and repeat steps 1-9.

11. When sampling is concluded for the day, clean and dry the Secchi disk, Secchi disk rope and other materials prior to storing. Carefully verify that the Secchi disk rope is completely dry before winding it on its holder as it is prone to mold and mildew.

DOCUMENTATION OF AGENCY CONSULTATION



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Green Bay ES Field Office
1015 Challenger Court
Green Bay, Wisconsin 54311-8331
Telephone 920/465-7440
FAX 920/465-7410

February 6, 2002

Mr. Loyal Gake, P.E
Director of Development and Regulatory Compliance
Flambeau Hydro, LLC
116 State Street
P.O. Box 167
Neshkoro, Wisconsin 54960

re: License Compliance Plans for the Flambeau Upper Project (FERC No. 2640), Flambeau Lower Project (FERC No. 2421), Pixley Project (FERC No. 2395) and Crowley Project (FERC No. 2473)

Dear Mr. Gake:

Your letters dated November 14, and December 20, 2001, and January 15, 2002 , requested U.S. Fish and Wildlife Service (FWS) review of Flambeau Hydro, LLC's (FHLLC) preliminary draft compliance plans for the referenced hydroelectric (hydro) projects on the Flambeau River. Our comments on each plan follow.

Water Quality Plans and Spill Containment Plans

The FWS will defer to the Wisconsin Department of Natural Resources (DNR) for review of these preliminary plans, but we reserve the right to comment on any revised draft plans issued by FHLLC.

Minimum Flow Compliance Plan for the Flambeau Upper Hydro Project

We recommend that the following items be included in the plan.

- The staff gauge will be calibrated to a stage discharge relationship consistent with U.S. Geological Survey (USGS) standards.
- The location of the staff gauge will be coordinated with the USGS and the Wisconsin Department of Natural Resources and FWS.
- The staff gauge will be notched (and numbered) to show where the water surface (stage) corresponds to the 50 cubic feet per second minimum flow.

- The FHLLC should decide how the minimum flow will be delivered to the bypass channel and state the method in the plan. As currently written, only a series of alternatives are proposed (i.e., tainter gate opened, modify a tainter gate, or add a siphon generator at the dam).

- If the minimum flow is interrupted, the reason and period of interruption will be recorded in the plant operation log sheets.

Purple Loosestrife Monitoring Plans

All plans state that the area to be inventoried shall be the shoreline of the impoundment up (landward) to a specific elevation. Please state in each plan what is the significance of that elevation. Are you referring to the elevation of the ordinary high water mark?

All plans state that for colonies less than 20 plants, FHLLC will take appropriate steps to eliminate the plants at the time of detection. Please describe what control methods you propose to implement.

We recommend that you add the following sentence to the plan for each hydro project. FHLLC will acquire informational signs from the Wisconsin DNR on purple loosestrife and post them on bulletin boards located at the recreational facilities of the hydro project.

We hope these comments are helpful in revising your preliminary compliance plans. If you have any questions on our comments, please contact me at (920) 465-7421.

Sincerely,

James D. Fossum

James D. Fossum
Acting Field Supervisor

cc: Jeff Scheirer, Wisconsin DNR, Park Falls, WI

Notes of the Agency Consultation Meeting - July 11, 2002

License Article Plan Preliminary Draft Reviews
Flambeau Hydroelectric Projects
(FERC Project Numbers 2640, 2421, 2395, 2473)

Collins Class Room Center - Room 326
University of Wisconsin - Stevens Point

Present:

Representing U.S. Department of Interior - Fish and Wildlife Service (FWS): Mr. James Fossum
Representing Wisconsin Department of Natural Resources (WDNR): Mr. Jeffrey Scheirer
Representing Flambeau Hydro, LLC. (FHLLC): Mr. Loyal Gake, Mr. Steven Loeffler, Mr. Richard Loeffler

10:03 am Meeting began with the approval of the current listing the following plans by Scheirer and Gake.

Run of River Monitoring Plan *(All four Projects)*
Run of River Testing Plan *(All four Projects)*
Continuous Minimum Flow Plan *(Flambeau Upper only)*
Water Quality Monitoring Plan *(All four Projects)*
Purple Loosestrife Monitoring Plan *(All four Projects)*
Spill Containment Plan *(All four Project)*
Erosion Control Plan (Crowley only)

Fossum: noted that Gake did not receive a "very friendly" letter from the FERC regarding plan submission.

Gake: said that in the past he had been making updates via phone, but, apparently the FERC wanted the reports in writing in order to distribute it for internal discussion.

Fossum: acknowledged receipt of Gake's recent letter to the FERC.

Scheirer: mentioned that the letter mentioned that a total of 30 of the 33 required plans have been submitted to FERC with the recreational plans (comments need) to be submitted.

Fossum: announced that he would be retiring at the end of the month. His replacement would not be assigned until January 2003. He proposed that his comments be incorporated into the draft and sent to Scheirer for review before sending in the final plans to the FERC. Draft copies sent to FWS would not be necessary, that Scheirer could provide comment and that he could send a letter to satisfy the consultation requirement. He further requested that copies of the final plans be mailed to the area FWS office. He expected to be performing some consulting work in the hydro industry during his retirement, so he would still "be around". He indicated that he had furnished some of his comments on the proposed plans to Scheirer.

10:16 am **Run-of River Monitoring Plans (all 4 Projects):**

Fossum: if the existing High Water Level staff gages were to be relocated, that he would like it if Scheirer and S. Loeffler would look at the gage locations during S. Loeffler's pending trip

to these projects. He would like to see notched gages at all 4 Projects, like FHLLC had built for Neshonoc.

Fossum: noted that the rating curves were not attached to any of the Preliminary Run-of-River Monitoring Plans.

Gake: These rating curves will be included with the Draft Plans.

Fossum: noted that the Preliminary Run-of-River Operating Plan for Upper mentions that a computer interface is used at Upper for monitoring and control.

Scheirer: asked whether the proposed system for recording headwater levels could also have a second device installed to record tailwater levels at the same Project.

Gake: the tailwater of the upstream Projects amounts to the impoundment of the next Project downstream. Monitoring the headwater of Lower, Pixley and Crowley is essentially monitoring the tailwater of the Project upstream. Reading a tailwater gage or installing a sensor to perform automated readings would not provide any additional data than analyzing the headwater level data of the following Project. The logged headwater data at the downstream Project will identify any fluctuations as a result of peaking. The FERC has addressed that issue.

Scheirer: agreed, but while that may be true of the first 3 Projects, it did not cover Crowley. The FERC has given the agencies the power to consult and recommend. This could be corrected by installing a sensor in the tailrace below Crowley.

Fossum: stated that an unrecorded free-flowing tailwater at Crowley would not fulfill the concerns of the FWS and the WDNR for verifying run-of river compliance. If Scheirer wishes to make a recommendation for a sensor there, he would have to concur with him.

Gake: suggested that he put the tailwater sensor issue down as a WDNR request.

Fossum: they need this data to base their decision regarding run-of-river compliance.

Scheirer: referred to the section of the Run-of-river Monitoring Plan dealing with black-start operations and asked for a definition of this type of operation.

S. Loeffler: explained that "black-start" referred to the a situation in which the power grid has failed, tripping the generators offline, with no external power source from which to operate Project lights, motors, pumps, or other electrically operated devices. The Project must have an internal independent power source to operate these functions or operations must be performed mechanically. Our concern at Crowley was not to allow the tailrace to dewater in the event of an outage. The 25% opening setting helps protect the tailrace environment until the operator can adjust for actual river flow at the Project.

Scheirer: the same is true at Lower and Pixley, as the tailwater of the upstream Project is the impoundment of the following dam. The real concern is at Crowley, which has no tailrace protection if the river flow is shut off. Asked Gake to clarify if the gates close fully before re-opening to 25%.

S. Loeffler: the wicket gate operation was a mechanical process. In the event of an outage the generators trip offline and the wicket gates coast down to a 25% opening.

Fossum: asked if that is the way FHLLC is proposing to operate the wicket gates during a black-start.

S. Loeffler: yes.

Fossum: suggested that a cfs value be determined based on the 25% wicket gate opening and added as a minimum flow through Crowley in the event of a grid outage.

Scheirer: a Project's operation log entry could be made for any black-start occurrence.

11:12 am **50 cfs Continuous Minimum Flow Plan (Upper Project)**

Fossum: a staff gage had to be installed in the by-pass reach below the taintor gates, calibrated to a stated discharge relationship either performed by the USGS or is consistent with their standards.

Gake: The USGS would likely recommend some sort of calibrated gate opening. FHLLC could easily provide a means to show the amount of flow passing through a taintor gate opening.

Fossum: the important issue was reliably providing at least 50 cfs minimum flow through the by-pass reach, FWS is flexible with the method used to accomplish it. Recommended that the operator requirements should be included in the plan.

Scheirer: agreed and commented that the operator requirement had been left wide open in the plan. A decision had to be made as to what method of supplying the 50 cfs minimum flow would be used.

Gake: FHLLC favors a taintor gate opening, modifying a taintor gate with a "cheater gate" opening, or installing a small turbine generator to provide the 50 cfs minimum flow.

Scheirer: asked which of these methods FHLLC wanted to use so that the details could be worked out.

Gake: stated that FHLLC is reluctant to name a specific method. FHLLC would like the option to be able to try a different approach if it becomes necessary.

Scheirer: that could be possible too. Maybe FHLLC could pass more than the 50 cfs.

Gake: agreed. FHLLC could keep the timeline to complete the minimum flow installation and state that the raised taintor gate method would be initially used. Any changes would be made with consultation involving the WDNR and FWS.

Scheirer: the risk WDNR/FWS takes is that if the taintor gate should freeze up and you have no backup, to maintain minimum flow in the winter. How would FHLLC maintain minimum flow.

Gake: the ice is steamed off to allow operation if it was necessary.

Scheirer: acknowledged Gake's reply and added that that could be written into Plan. The third paragraph in the Preliminary Draft of the 50-cfs Continuous Minimum Flow Plan refers to when flows in the Flambeau River exceed 200 cfs in the by-pass reach and the maximum capacity of the turbines. FHLLC will discharge excess flows through the existing choke valve in the powerhouse up to the maximum hydraulic capacity of the valve. WDNR wanted to use some of the water that would have normally been wasted through the choke valve and divert it through the by-pass reach up to a maximum flow of 200 cfs. Which is what WDNR determined to be the optimal flow to maintain suitable habitat in that by-pass reach. If flows would exceed 200 cfs in the by-pass reach, the choke valve would be used up to its maximum capacity to waste water though the powerhouse. When the choke valve capacity was exceeded, only then would the taintor gates be opened further to pass any higher flows. This is not what is in included in the Plan, but it is specified in the License article.

R. Loeffler: replied that he took the wording from the license and copied it verbatim into the Plan.

Fossum: for consulting of the compliance Plans, there is the opportunity to add more detail.

R. Loeffler: asked Scheirer if what the WDNR had in mind was to forego using the choke valve and pass all excess flows through the by-pass reach once turbine capacity was reached.

Scheirer: yes.

Gake: the wording in the Plan is exactly from the license. He asked if WDNR would prefer that all flows in excess of the turbines be directed through the by-pass reach rather than using the choke valve.

Scheirer: no. The license wording does not state that the choke valve cannot be used until the capacity of the turbines and 200 cfs is being passed though the by-pass reach. He requested that the description be amended to state that the choke valve cannot be used until the turbine capacity and 200-cfs flow limit in the by-pass reach has been exceeded.

R. Loeffler: suggested that there should be two markers installed on the taintor gate, one marking the 50 cfs minimum flow and one marking the 200 cfs flow limit.

Scheirer: agreed. Between those two marks would indicate compliance.

S. Loeffler: making adjustments to the turbines can be performed remotely. If the choke valve were open, the turbines could actually be controlled remotely to reduce production to compensate for lesser flows without the need for the operator to visit the Project, but it would be better to manually close the choke valve and maintain production levels. .

Scheirer: stated that he had several designs for indicators that may help in the design for the marker system on taintor gate 2 and offered to furnish them. He recommended that when calibrating the taintor gate for the 50 and 200 cfs flows, that the minimum legal Project operating limit be used to insure that no less than these flows will be passed during any legal operating level of the Project, the operating range was 6 inches.

Fossum: asked if FHLLC would be having the calculations performed by an engineering firm or whether the calculations would be performed in-house.

Gake: Mead & Hunt had already done the gate ratings. FHLLC would supply WDNR and FWS with the computations so that an agency hydrologist could review them.

The meeting adjourned 11:53 am for lunch.

1:00 pm Run-of-River Operation Testing Plans (all 4 Projects):

Fossum: recommended that annual interim reports be furnished to the agencies for review. Interim reports allow the agencies to review the previous year's results. If necessary, schedule meeting to discuss and/or resolve any problems that might have developed. FWS finds interim reports a valuable asset in the testing process.

Gake: agreed. FHLLC would be happy to furnish WDNR and FWS with the data on a yearly basis.

Fossum: no formal report would be required, the raw data would be acceptable. It would be preferred that the data be furnished in a file on a computer disk. That would allow us to scan the data and discuss any problems quickly and efficiently. He recommended that FHLLC should obtain and include tailwater data at Crowley for the reasons discussed earlier.

Scheirer: concurred with Fossum's statements and recommendations, emphasizing on obtaining tailwater at Crowley and added that if the headwater logger will provide the tailwater data requirement for Pixley, Lower and Upper, then the tailwater logging requirement would be satisfied. Gake had agreed to check into the tailwater/impoundment issue and somehow verify that they would amount to collecting the same data.

Scheirer: offered a general recommendation for all Plans, that the entire verbatim language of the appropriate License Article(s) be documented within each Plan. He noted that this had been done on several, but not all of the submitted Plans.

Fossum: asked if there needed to be a mandatory meeting following annual interim reports and if it should be written into the Plan, or whether a meeting should be arranged only if it were deemed necessary.

Gake: a mandatory meeting would not be necessary.

1:13 pm **Purple Loosestrife Monitoring Plan (all 4 Projects):**

Gake: R. Loeffler will be performing the survey.

Fossum: **asked for a definition of a speciafied elevation on the shoreline impoundment.**

R. Loeffler: explained that it is like a defined line in the sand. He doesn't want to get too far out of the Project Boundary area. Generally, Purple Loosestrife is found along the shorelines. Basically, the survey involves traveling down the river in a boat and what is visible from the shoreline is marked, unless there are project lands, in which the survey is conducted on foot and covers all project lands. The Flambeau Projects have very little Project lands right by the powerhouses, which is very simple to cover. The Plans state within the Project boundaries. Any occurrences within the Project boundary are recorded. The survey area includes everything within the Project boundary, which is why the maps were included in the Plan. The four Plans included all the river shorelines from just below the rapids approximately 3 miles upstream from the Upper Project to the Crowley Project. He would mark down any plants he observed during the survey, however FHLLC's obligation would be to only those plants discovered within the actual Project boundary. If there were any control or removal to be conducted, FHLLC would not take any action on plants outside the Property boundary. Currently there were no officially accepted means of controlling Purple Loosestrife on a large scale that was economically feasible. Small stands involving a couple plants are physically removed when encountered. There is ongoing experimentation by WVIC with weak mixtures of Round-Up and Rodeo sprayed, but this has not been approved by the agencies.

Gake: answered that Scheirer's understanding of the survey techniques was correct.

Scheirer: acknowledged and accepted Gake's explanation. He commented that he believes that what FHLLC proposes to do is sufficient.

Fossum: asked if FHLLC was going to put up informational signs about Purple Loosestrife at the recreational sites. FWS would like to see that done. The WDNR has signs and brochures.

Gake: asked if WDNR and FWS would like FHLLC to post WDNR furnished signs at the recreational sites and add that into the Plan.

Scheirer: stated that he thought it was a good idea to post the signs. He understands that FHLLC is developing recreation brochures and that if there is a distribution box made available for Purple Loosestrife brochures, that the WDNR could make the Purple Loosestrife brochures also.

1:31 pm **Water Quality Monitoring Plan (all 4 Projects)**

S. Loeffler: stated that the Plans were patterned off of the water quality monitoring plan at Oconto Falls Lower Project which had been formally approved by the WDNR and FWS.

Scheirer: acknowledged S. Loeffler's statement. He continued that the WDNR purpose for a Water Quality Monitoring Plan was two-fold, one was to get some indication of long-term trends, and the second was to insure that water quality standards were being met. To get that information on long-term trends, WDNR will be requesting monitoring every year instead of every fifth year after the first four. The sampling locations were identified as the deepest spot of the impoundment and that is where WDNR would do it as well. But we might suggest that in the first year in the summer months that sampling be conducted elsewhere to see if there are problems that would indicate where subsequent sampling should occur.

S. Loeffler: asked if the WDNR was asking for sampling in two places during the summer.

Scheirer: no, the summer locations would be based on a review of the first summer data collection and the historical record. Instead of picking the deepest part of the impoundment, the WDNR would go out and look at summer measurements. To get the annual trends the WDNR water quality biologist he consulted with felt that a 5-year sampling interval was too long between samplings.

Gake: The WDNR has asked that during this initial sampling, to sample a couple of different sites.

Scheirer: The site would be chosen based on historical record or by sampling additional locations the first year. The decision for WDNR to perform the additional sampling was based on WDNR input and reconnaissance.

S. Loeffler: produced the sampling data and lab reports for the Spring 2002 water quality sampling event and gave Scheirer and Fossum complete copies.

Scheirer: remarked that he didn't realize that FHLLC had started sampling this year.

Gake: FHLLC had started many License Article requirements long ago, even before the purchasing the Projects, and this was one of those items.

Scheirer: commented to describe the secchi disk method that will be used, putting down on paper the procedure that would be used to collect that data. Apparently there are subtle differences in accepted procedures that would result in a different reading. The Plans state that Dissolved Oxygen and temperature vertical profiles would be taken at 3-foot intervals and the reviewer suggested to make them in 1-foot intervals to put them in comparable frequency with the data that the WDNR has already collected.

S. Loeffler: explained he had consulted with Mary Gansberg at the WDNR office in Green Bay and she recommended 1-meter or 3-foot intervals which are the generally accepted intervals for water sampling. Since the equipment used is certified in 3-foot intervals, the 3-foot distance was selected rather than adjusting for meters.

Scheirer: the next comment was that all measurements should performed on the same day at all 4 Projects in upstream to downstream order.

S. Loeffler: One person is required to perform the testing to insure consistency in sampling.

Scheirer: a color test sample should be taken at each project. This was a request submitted by a WDNR water biologist due that the river is stained, and the test has to do with chlorophyll. The biologist indicated that this was an inexpensive test to run through a lab. That might be some rationale or incentive for you to do this long-term monitoring to confirm the mid-summer dissolved oxygen problems are no longer a problem and that FHLLC can discontinue the use of the aerators at Pixley, increasing that Project's efficiency.

Gake: stated that he was glad Scheirer brought up the aerators at Pixley. They are actually poor aerators and may be unnecessary.

Scheirer: if the aerators are unnecessary and can confirm that they are not needed, then lets discontinue them. The WDNR would like continuous monitoring below the mixing zone of the tailrace in order to evaluate the effectiveness of the aerators at Pixley, in order to make a determination whether the aerators were actually necessary or effective in preventing low dissolved oxygen levels below the dam. The WDNR would like to see monitoring at 1-hour intervals. That it is important to have the hourly monitoring because there might only be one short period when the dissolved oxygen fell below the state minimum of 5 mg/l and a daily sampling could easily miss the event.

S. Loeffler: how long the monitoring would have to take place.

Scheirer: that it would likely be for two months - July and August for one year.

Fossum: there were no remediation contingencies listed in the plan, should it be discovered that a problem existed.

Gake: these would be addressed individually if a circumstance arose.

2:05 pm **Spill Containment Plan (all 4 Projects)**

Scheirer: the intent of a spill containment plan was to prevent spills from occurring rather than a plan of action after a spill occurred and that should be emphasized in these Plans. There appeared to be known inventory missing from the inventory listed in the plan that would constitute a potential spill hazard. Scheirer asked if the items listed in the Plans were the only items that were located at the Projects. He asked that the plan contain a complete listing of all compounds stored in the powerhouse.

S. Loeffler: asked if the Plan needed to include temporarily stored compounds, such as paints that might be stored for a few days or weeks in the powerhouse before being used. He would make a list for each powerhouse when he visited the Projects for water quality sampling later in the month and in August.

Scheirer: recommended that the section of the plan referencing training of personnel should be written clearer and describe the type of training and the frequency that training will be performed. He noted that the Plan referenced sealed drains in the powerhouse. By his definition a sealed drain would be one that could not be opened as opposed to a covered drain that could be opened. He asked what these drains emptied into. Noted that this was his concern, if a spill occurred, could the spill pass through the drain into the river. Are the drains covered to prevent this or merely covered as with a grate to prevent things from falling into them.

S. Loeffler: stated that at all 4 Projects the drains were sealed so that a spill would not pass into them unless they were opened.

Scheirer: asked if all the spillable materials stored in the powerhouse were confined in some sort of secondary containment capable of handling all the volume within the containment.

S. Loeffler: answered that everything was stored in bunkers capable of containing everything stored in them.

Scheirer: stated that he understood that there were significant quantities of hydraulic oil that were used by the turbine. He asked where and how much oil was used.

Gake: explained that it was used to operate the turbine wicket gates and cool the generator and turbine bearings. None of the oil was discharged into the river, it was a closed system and recycled over and over. He explained that any leaks from the pipe connections in the system occur on the generator floor.

R. Loeffler: added that these are small leaks, maybe one or two drops a week, which are collected in absorbent pads on the floor and thrown out by the operator when they become saturated.

Scheirer: said that he understood but recommended that the operators keep and maintain a log listing the amount of oil they are consuming in the powerhouse. Whenever they have to add oil to the system.

S. Loeffler: asked if the log should also keep track of the amount of oil recovered also, the amount estimated to be in the pads when they are thrown out.

Scheirer: yes, that would be fine. He is interested in the amount that cannot be accounted for.

2:35 pm **Shoreline Buffer Zone Plan (Pixley and Crowley)**

Fossum: indicated that he has not had time to review these plans and prepare comments or recommendations. He asked if it would be acceptable to provide any comments, concerns or recommendations via e-mail to Scheirer and Gake.

Scheirer: stated that he also did not have time to review these plans or prepare any response and offered to send his comments to Fossum and Gake via e-mail also.

It was mutually agreed to conduct this consultation for these plans via e-mail addressed to Gake.

2:40 pm **Erosion Control Plan (Crowley)**

Fossum: stated that he had not had time to review this plan either.

Scheirer: expressed that he had not had the time to review this plan either and suggested that they consult via e-mail on this plan also.

It was mutually agreed to conduct this consultation for these plans via e-mail. E-mails addressed to Gake.

2:43 pm **Recreation Plan (all 4 Projects**

Gake: S. Loeffler will be performing an extensive survey of existing recreation resources and resources required by the license that remain to be completed when he travels to the area to perform the water quality testing in July and August. This should get us back on our timeline for completion.

Scheirer: commented that perhaps he and S. Loeffler could review the resources together during his visit.

S. Loeffler: agreed to contact Scheirer to schedule a time to review and visit the various sites as he has never been to most of them and is unsure of the precise location of several sites.

As there were no further comments, the meeting was adjourned at 2:53 pm.

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January 28, 2003

Mr. Jeffrey Scheirer
Northern Region FERC Project Manager
Wisconsin Department of Natural Resources
875 South 4th Ave.
Park Falls, WI 54552

FILE COPY

Ms. Janet Smith
Field Supervisor
U.S. Fish and Wildlife Service
2661 Scott Tower Drive
New Franken, WI 54229

Re: ***Draft Water Quality Monitoring Plan; Flambeau Hydro, LLC***
Flambeau Upper Project, No. 2640, Article 408
Flambeau Lower Project, No. 2421, Article 406
Flambeau Pixley Project, No. 2395, Article 406
Flambeau Crowley Project, No. 2473, Article 406

Dear Jeff and Janet:

Enclosed is a copy of Flambeau Hydro, LLC, *Draft Water Quality Monitoring Plan* for the projects listed above as required by their corresponding FERC license articles also listed above.

As you might be aware we have started taking sampling data. Readings were recorded for the summer of 2002.

We invite you to review and comment. If you have any questions or wish discussion pertaining to these plans, please call me at (920) 293-4628 ext. 12. Your cooperation is appreciated.

Sincerely,
NORTH AMERICAN HYDRO, Inc.

Loyal Gake, P.E.
Director of Development and
Regulatory Compliance

Enclosures: As Indicated
Cc: Ms. Magalie R. Salas, FERC
Mr. Scott Klabunde, NAH

03-01-24 loyal water quality mon plan flam cov ltr-U408 L406 P406 C406.doc

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
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February 19, 2003

Charles F. Alsberg
Flambeau Hydro, L.L.C.
116 State Street, P.O. Box 167
Neshkoro, WI 54960

Subject: Comments on Draft Water Quality Monitoring Plans
Article 408—Upper Hydroelectric Project (FERC Project No. 2640)
Article 406—Lower Hydroelectric Project (FERC Project No. 2421)
Article 406—Pixley Hydroelectric Project (FERC Project No. 2395)
Article 406—Crowley Hydroelectric Project (FERC Project No. 2473)

Dear Mr. Alsberg:

The Department offers the following comments and recommendations on the draft water quality monitoring plans that Flambeau Hydro prepared for its four hydroelectric projects on the North Fork Flambeau River. Since the four draft plans were similar in content, we have consolidated our remarks into a single response. Please revise the drafts to incorporate our recommended changes and additions before you submit the plans to the Federal Energy Regulatory Commission.

Purpose of Studies
We recommend the following substitution for the paragraph that describes the *Purpose of Studies*. The purpose of the water quality studies is to establish a long-term database of water quality measurements to document the trophic state, and the dissolved oxygen and temperature profiles of the Upper Hydro Project impoundment at the time and location of sampling events.

Study Sampling Periods
In the draft plans you proposed to monitor water quality with 3 sampling events each year for the first four years, then with 3 sampling events every fifth year thereafter. Annual monitoring will provide information useful in detecting long-term trends and changes in water quality. The same data collected at 5-year intervals would not provide sufficient resolution to identify changes in water quality, and consequently the objectives of the plans would not be achieved. Three sampling events per year over the license term is consistent with the monitoring frequency in similar water quality plans that the Commission approved for two other hydroelectric projects on the Flambeau River.[1]

With regard to the proposed definition of iceout, we would not object to expanding the 7-day period to 14 days, if high flow or other adverse conditions cause delay. The predictive capability of the model will not be compromised if the first samples take place within that timeframe each year. In all circumstances, the safety of sampling personnel should receive highest priority.

[1] 80 FERC ¶ 62,263 and 80 FERC ¶ 62,257

Sampling Protocol

Location—You stated that prior to the 2002 water quality study implementation, a reconnaissance of the impoundment would be performed to establish one permanent sampling location that is representative of the maximum depth in the main channel and that is easy to locate again for subsequent sampling events. Presumably, the sample location maps in the draft plans indicate the sampling locations that you established in 2002. We agree with the criteria used to select the permanent sites. However, as we explained at the meeting on July 11, 2002, we would like to have input on site selection, based on a comparison of dissolved oxygen profiles among sites in the summer. Department staff will measure dissolved oxygen at several sites in July or August 2003 and provide a follow-up recommendation on site selection shortly afterward.

Total Phosphorus—The certified laboratory that analyzed the 2002 samples for total phosphorus has unacceptable limits of detection (LOD) and limits of quantification (LOQ). The lab that analyzed samples from 2002 reported LOD and LOQ for total phosphorus as 0.020 and 0.067 milligrams/liter, respectively. Five of the eight August samples had reported concentrations less than the LOQ. The remaining three August samples barely exceeded the LOQ at 0.070 mg/l. Because phosphorus is a limiting nutrient that controls primary productivity in aquatic systems, it is necessary to detect small changes in low-level concentrations of this element. If LOD and LOQ for phosphorus are too high, the data will not reveal changes in the system's trophic status. The certified laboratory should select analytical procedures to yield an LOD of 0.005 mg/l for total phosphorus. Similarly, the certified lab should use appropriate methods to report an LOQ less than the concentration of the lowest field sample.

Chlorophyll a—Please note that the volume of water to filter for this analysis will vary, depending on both the secchi disk depth and the certified laboratory doing the analysis.

Temperature and dissolved oxygen profiles—The depth interval for measurement of temperature and dissolved oxygen should be reduced from three feet to one foot in any portion of the water column where dissolved oxygen is less than the 5.0 mg/l standard. Please provide some blank spaces in the table for dissolved oxygen and temperature profile data to allow additional measurements to be recorded on the *Impoundment Sampling Log*. Finally, please specify in the text of this section that two additional measurements of temperature and D.O. will be taken ½ foot below the surface and ½ foot above the bottom. Presently, the draft plans call for an additional sample measured immediately below the surface and another sample measured immediately above the bottom. The change is necessary to be consistent with the table on the *Impoundment Sampling Log*.

Sampling Event Coordination—Although diurnal effects on water quality may influence the comparability of samples and measurements taken on the same day, we believe the benefits of same-day sampling outweigh the disadvantages. We recommend that you start each sampling event at the Upper Project and proceed sequentially in downstream order to the other impoundments, (i.e. Upper, Lower, Pixley, then Crowley).

At the meeting on July 11, 2002 we briefly discussed whether or not it was necessary to postpone sampling until runoff and flow subsided after heavy summer rainfall events. Our Water Quality Biologist believes that it is not necessary to delay sampling after summer rainfall. Presently, such a provision does not appear in the draft plans, and there is no need to include one.

Sampling Event Submissions—The licensee should forward to the Department the laboratory analysis results and *Impoundment Sampling Logs* of individual sampling events for the first 2 years of sampling following the Commission's approval of these plans and for 2 years following FERC's approval of any license transfer. Thereafter, it will not be necessary to submit individual reports for each of the three

sampling events every year, provided that the Department has an opportunity to review the draft reports annually before they are filed with the Commission.

Special Notifications—Some of the notifications itemized in this section will not be necessary, and some others that were not listed should be included.

1. Please notify the Department within 2 business days whenever dissolved oxygen concentration drops below 3 mg/l. The annual reports will indicate when water quality did not meet the minimum standard for dissolved oxygen. The 3 mg/l threshold for immediate notification is closer to the oxygen concentration below which fish and aquatic life are in jeopardy.
2. Also, we would appreciate if you let us know the date and time for scheduled sampling events at least 2 days in advance.
3. Notification is not necessary when adverse conditions delay or prevent sampling, unless you have already given us the notice requested in #2 above. Flambeau Hydro should reschedule around unfavorable circumstances as necessary to complete the sampling events within the recommended periods.
4. You should notify us of equipment failure that would preclude completing a sampling event. Depending on availability, the Department may be able to provide sampling equipment on loan for brief periods.

Reports—Because of the extended timeframes between various steps that were outlined in this and other sections of the draft plans, any potential disagreements that arise may not be fully resolved before the start of the next sampling season. In that case, the same unsolved problems could continue to complicate the studies in several years. To provide sufficient time to reach consensus prior to the first sampling event of the following season, we recommend that you compress the schedule, so that the 60-day and 90-day periods are reduced to 30 days.

Training—All personnel involved in monitoring water quality at these projects should be adequately trained in sampling and measurement techniques, sample handling and preservation, and boat safety. Any equipment should be used according to the manufacturer's instructions for calibration, maintenance, and operation. We recommend annual refresher training in early spring before the first sampling event.

If you have any questions about our comments on the draft water quality monitoring plans, please contact me by phone at (715) 762-4684, extension 131, or by e-mail at Jeffrey.Scheirer@dnr.state.wi.us.

Sincerely,

Jeff Scheirer

Jeff Scheirer
Northern Region FERC Project Manager

Cc: Janet Smith, U. S. Fish and Wildlife Service