

126 FERC ¶ 62,047
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

TransCanada Hydro Northeast, Inc.

Project No. 1904-067

ORDER APPROVING DISSOLVED OXYGEN AND TEMPERATURE MONITORING
PLAN PURSUANT TO ARTICLE 405

(Issued January 22, 2009)

On January 18, 2008, and supplemented on April 21, 2008, TransCanada Hydro Northeast, Inc. (TransCanada, licensee) filed its Dissolved Oxygen and Temperature Monitoring Plan (plan) for the Vernon Hydroelectric Project, pursuant to article 405 of the project license.¹ The project is located on the Connecticut River, in Cheshire County, New Hampshire and Windham County, Vermont.

BACKGROUND

On March 1, 2006, TransCanada filed an application for amendment of its license to replace certain generating units. The amendment approved the replacement of four existing 2.0 megawatt (MW) turbine/generator units with four new 4.0 MW units.

License article 405 requires the licensee to file for Commission approval several plans outlined in the Water Quality Certificate (WQC) issued by the New Hampshire Department of Environmental Services (NHDES), contained in Appendix A of the license. Condition E-5 of the WQC requires the licensee to develop a plan to monitor dissolved oxygen and water temperature in the Connecticut River to ensure compliance with New Hampshire and Vermont Class B surface water quality standards. If violations of Class B surface water quality standards occur or persist, the licensee must revise the project operations plan to include additional measures to meet dissolved oxygen (DO) standards. The plan is required to be developed in consultation with the NHDES and the Vermont Department of Environmental Conservation (VTDEC), with final approval by the NHDES. After agency approval, the plan is to be submitted to the Commission and upon Commission approval, the licensee would implement the plan.

¹ See ordering paragraph (O) and condition E-5 of Appendix A of the Order Amending License, issued July 28, 2006 (116 FERC ¶62,078).

PROPOSED PLAN

The licensee's plan describes a program for monitoring of DO and water temperature in the Connecticut River to ensure that water quality standards are maintained subsequent to the replacement of the four 2.0 MW units with four new 4.0 MW generating units. The Connecticut River is classified as Class B by the states of New Hampshire and Vermont. In New Hampshire, water quality standards require instantaneous DO concentrations greater than 5 milligrams per liter (mg/l) and at least 75 percent DO saturation based on a daily average. In Vermont, for cold water non-spawning or nursery fish habitats, the water quality standard is at least 6 mg/l and at least 70 percent saturation at all times.

The plan notes that the project is operated in conjunction with the other hydroelectric generating facilities on the Connecticut River, in a coordinated manner that takes into consideration variations in demand for electricity as well as natural seasonal flow variations in the river system. Additionally, the Vermont Yankee (VY) plant, located approximately one-half mile upstream from the Vernon Project, conducts extensive temperature and DO monitoring at locations upstream and downstream of the project. The licensee considers that the VY data is adequate documentation of DO and temperature baseline conditions at Vernon, prior to installation of the four new generating turbines. The licensee's monitoring would consist of collecting grab samples of DO (mg/l and percent saturation) and temperature data upstream and downstream of Vernon Dam at three sampling stations: one upstream (Station A) and two downstream of the project (Station B approximately 100 meters downstream of the powerhouse and Station C approximately 350 meters downstream of the dam and powerhouse at the mid-point of a channel near an unnamed island). Monitoring would be conducted using standard field multi-parameter water quality meters that measure temperature, DO, conductivity and depth. Ideally, sampling events will be conducted at times when the new turbines are operating and when limiting water quality conditions are likely to exist. These periods typically occur during late summer when river flows can be low and ambient temperatures can be relatively high. A total of six monitoring events would be done: one each in July, August and September in two successive years beginning in 2009. Each event will consist of four samples at each of the three stations.

At the conclusion of each year's monitoring, the licensee will prepare and submit a report to the NHDES and VTDEC. In the event that any persistent project-induced water quality standard violations of temperature or DO occur, the licensee will consult with the NHDES and VTDEC to address those violations. The plan would then be modified and if successful the following year, a final water quality monitoring report would be filed with

the agencies and the Commission that reflect any changes. The licensee anticipates being required to continue such measures into the future. If concerns regarding the monitoring methods or results are expressed by the agencies, the licensee will consult further with the NHDEC and VTDEC to attempt to address those concerns prior to filing the final report.

CONSULTATION/COMMENTS

The NHDES provided comments on the licensee's initial plan by letter dated December 19, 2007. The NHDES requested that the plan be modified to provide a water temperature/DO profile for sampling Station A and for replicate sampling after every tenth sample as a quality control check. The licensee addressed these comments in its supplemental filing of April 21, 2008. The VTDEC did not comment on the plan.

DISCUSSION

The purpose of the plan is to evaluate the effect of project operations subsequent to the installation of the four new turbines on water quality in the Connecticut River. The licensee's plan was developed in consultation with the NHDES and the VTDEC. The licensee incorporated the comments from the NHDES, which approved the plan as required by article 405. The plan meets the requirements of article 405 and should, therefore, be approved.

The Director orders:

(A) TransCanada Hydro Northeast, Inc.'s Dissolved Oxygen and Temperature Monitoring Plan for the Vernon Hydroelectric Project, filed on January 18 and supplemented on April 21, 2008, is approved.

(B) This order constitutes final agency action. Requests for a rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

George H. Taylor
Chief, Biological Resources Branch
Division of Hydropower Administration
and Compliance

Dissolved Oxygen and Temperature Monitoring Plan

Vernon Hydroelectric Project
FERC Project No. 1904

December 2007

TransCanada Hydro Northeast Inc.
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TABLE OF CONTENTS

U1.0	INTRODUCTION	1
2.0	SCOPE OF THE PLAN.....	2
3.0	VERNON STATION OPERATIONS.....	2
4.0	EXISTING WATER QUALITY DATA AND MONITORING PROGRAMS.....	3
5.0	MONITORING PROGRAM.....	9
5.1	Monitoring Stations	9
5.2	Sampling Devices	11
5.3	Quality Control Measures.....	11
6.0	IMPLEMENTATION SCHEDULE.....	12
6.1	Monitoring Schedule.....	12
6.2	Reporting.....	12
APPENDIX A – AGENCY COMMENTS		
APPENDIX B – RESPONSE TO AGENCY COMMENTS		

1.0 INTRODUCTION

This Dissolved Oxygen and Temperature Monitoring Plan is being submitted by TransCanada Hydro Northeast Inc. (TransCanada) to the New Hampshire Department of Environmental Services (NHDES, or DES) and to the Vermont Department of Environmental Conservation (VTDEC) for review and approval, in accordance with:

- Condition E-5 of the New Hampshire Clean Water Act Section 401 Water Quality Certificate issued on July 3, 2006; and
- Article 405 of the Federal Energy Regulatory Commission (FERC) Order amending the FERC License for the Vernon Hydroelectric Project, FERC No. 1904 (the Project) issued on July 28, 2006.

Condition E-5 of the New Hampshire Water Quality Certificate states:

“The Applicant shall develop a plan to monitor dissolved oxygen and water temperature in the Connecticut River to ensure the Activity complies with New Hampshire and Vermont Class B surface water quality standards. The plan shall be submitted to DES and VTDEC for review and approval...The plan shall include a schedule for implementation. If violations of Class B surface water quality standards occur or persist, the Applicant shall revise the operations plan to include additional measures to meet dissolved oxygen standards. Any revised plan shall be submitted to DES and VTDEC, for review and approval, prior to implementation.

Article 405 of the FERC Order states:

“The licensee is subject to the conditions of the Water Quality Certificate, issued by the New Hampshire Department of Environmental Services, pursuant to Section 401 of the Clean Water Act. The Water Quality Certificate is set forth in Appendix A to this order and is incorporated in the license. The Water Quality Certificate requires the licensee to prepare the following plans for approval by the New Hampshire Department of Environmental Services. After agency approval, these plans shall be submitted to the Commission for approval 120 days after the issuance date of this order.

<i>Condition</i>	<i>Description</i>
<i>E-3</i>	<i>Operations Plan</i>
<i>E-4</i>	<i>Flow Release Monitoring Plan</i>
<i>E-5</i>	<i>Dissolved Oxygen and Water Temperature Monitoring Plan</i>
<i>E-6</i>	<i>Erosion Monitoring Plan</i>
<i>E-9</i>	<i>Debris Removal Plan</i>

The licensee shall submit to the Commission documentation of its consultation, copies of comments and recommendations made in connection with each plan, and a description of how each plan accommodates the comments and recommendations. 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 make changes to any plan submitted. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission."

2.0 SCOPE OF THE PLAN

This Plan describes TransCanada's proposed program for monitoring of dissolved oxygen and temperature in the Connecticut River at the Vernon Project to ensure that water quality standards are maintained subsequent to the replacement of four 2.0 MW generating units with four new 4.0 MW generating units. The Connecticut River near the Project is classified by the States of New Hampshire and Vermont as Class B water. In New Hampshire, water quality standards require instantaneous dissolved oxygen (DO) concentrations greater than 5 mg/l, and at least 75 percent DO saturation based on a daily average. In Vermont, for cold water non-spawning or nursery fish habitats, the water quality standard is at least 6 mg/l and at least 70% saturation at all times. The following sections of this Plan discuss the proposed monitoring program including Project operations; frequency and duration of monitoring; data collection equipment and methodology; schedule for implementation; and reporting and plan revision.

3.0 VERNON STATION OPERATIONS

Vernon Station is operated in conjunction with the other hydroelectric generating facilities on the Connecticut River, in a coordinated manner that takes into consideration variations in demand for electricity as well as natural seasonal flow variations in the Connecticut River system. Flows in this reach of river are highly regulated by the upstream hydroelectric projects, except under high flow conditions. Powerhouse discharge capacity and maximum output is a function of gross head, and the tailrace elevation is further affected by the reservoir elevation associated with First Light Power's Turners Falls Project (FERC Project No. 1889).

The highest flows typically occur during the spring freshet during March, April, and May, and the lowest flows generally occur during the later summer months of July, August, and September. However, high flows can occur during any time of the year in response to high precipitation events. Typically, when flows are less than the project's hydraulic capacity, the project operates in a daily cycle run-of-river mode, where daily inflow matches daily outflow. Generation can vary during the course of the day between the required minimum flow (1,250 cfs or inflow if less), and full capacity if higher flows are available. Upstream and downstream fish passage requirements are provided by additional bypassed flow in accordance with seasonal fish migration schedules.

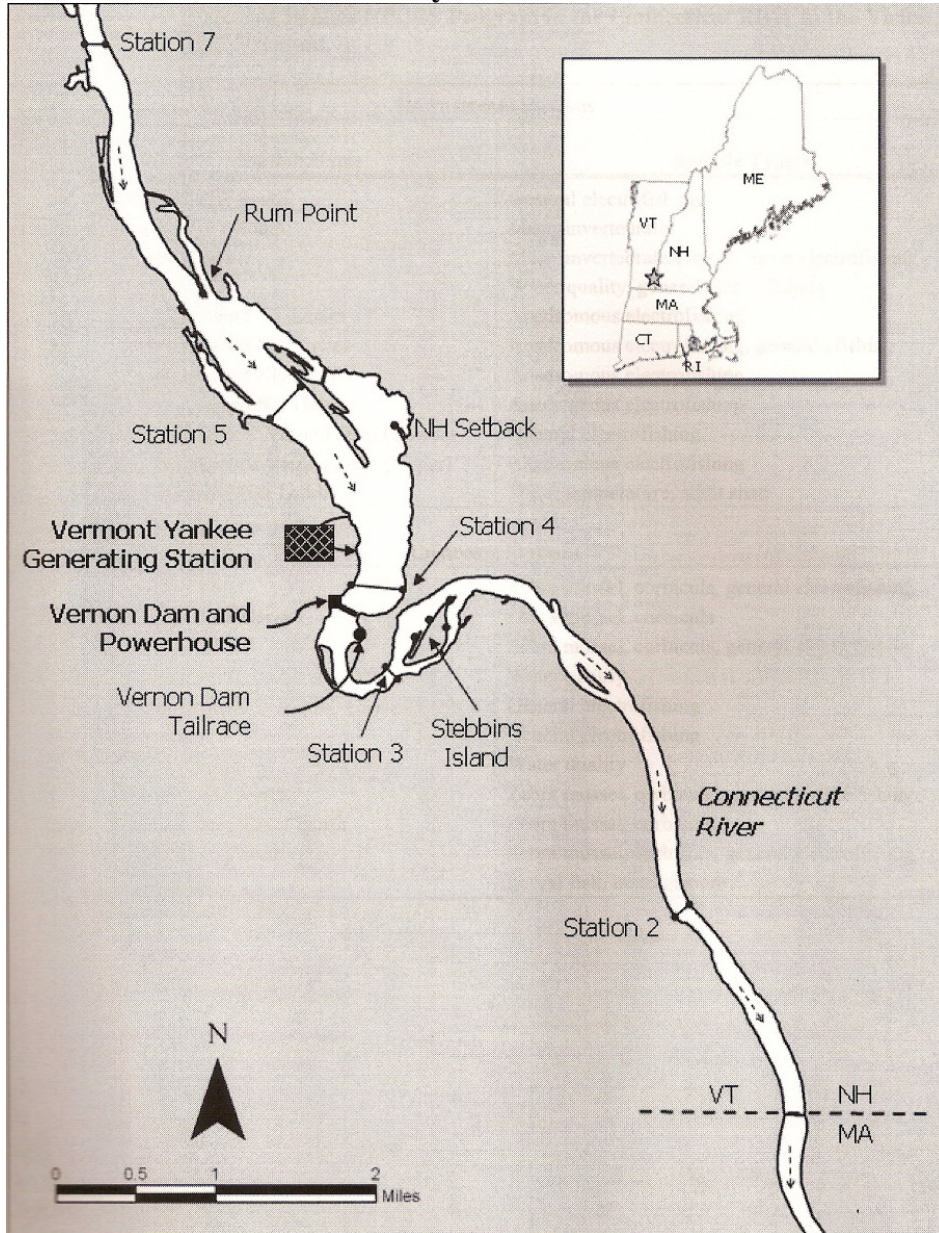
Once the four new generating turbines become operational, the amount of flow once spilled but now available for generation through the new units is unlikely to have a significant effect on water temperature or dissolved oxygen. Any changes in spill would be most likely to occur during high flow periods when DO is typically at saturation and temperatures are cool. It should be noted that the temperature regime of water passing through the Vernon powerhouse is most strongly influenced by atmospheric heating and cooling and to a lesser extent the relatively small volume (up to 800 cfs) of slightly heated non-contact cooling water discharged from the Vermont Yankee Nuclear Power Station located about one-half mile upstream (Normandeau Associates, 2004).

4.0 EXISTING WATER QUALITY DATA AND MONITORING PROGRAMS

Vermont Yankee (VY) conducts extensive temperature and DO monitoring at multiple locations both upstream and downstream of the Vernon Project. Sampling locations are shown on Figure 1 below. Temperature is continuously monitored at Station 7 upstream of VY and at Station 3, located approximately one-half mile downstream of the Vernon Project; as well as at the Vernon fish ladder when it is operational. Tables 1-A, 1-B, and 1-C below, provide VY's DO and temperature data at some of their sampling stations for the summers months in 2004, 2005, and 2006, respectively. While percent saturation data is unavailable for DO, the tables show that DO in mg/l remained above water quality standards both upstream and downstream of Vernon Dam for all sampling dates.

Figure 1

**Vermont Yankee Water Quality Sampling Stations
in the Vicinity of Vernon Station**



Source: 2006 VY NPDES Monitoring Report #36

Table 1-A
Water Quality Data from Vermont Yankee – 2004

Sampling Station	Month	May		June		July		August		September		October	
	Statistic	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l
Station 5 - Upstream of Vermont Yankee	Min	15.8	8.4	14.4	8.4	22.0	8.8	22.1	7.7	16.0	7.9	13.2	7.8
	Max	19.0	9.5	23.0	12.3	26.0	10.6	22.2	8.1	22.2	12.2	20.6	10.8
	Mean	17.0	9.1	18.3	10.4	23.7	9.4	22.1	7.9	18.2	9.7	16.5	9.4
	N	6	10	20	20	28	28	12	12	24	24	14	10
Station 4 - Between VY and Vernon Dam	Min	16.5	8.4	16.3	8.0	23.2	8.8	26.0	7.5	17.2	8.1	9.5	10.2
	Max	16.5	9.1	25.0	8.8	27.0	9.2	26.0	7.5	22.0	10.0	17.0	10.5
	Mean	16.5	8.8	20.4	8.6	25.0	9.0	26.0	7.5	19.3	8.7	14.4	10.4
	N	2	4	10	10	10	10	6	6	10	10	7	5
Vernon Dam Tailrace - NH Side	Min	15.0	9.8	22.0	9.2	24.0	8.4	22.8	7.5	17.0	8.9	11.0	9.4
	Max	15.0	9.8	22.0	9.2	25.5	8.4	25.0	8.8	24.4	10.2	17.5	10.5
	Mean	15.0	9.8	22.0	9.2	24.8	8.4	23.9	8.2	19.9	9.4	14.2	9.8
	N	1	1	1	1	4	4	4	4	8	8	6	6
Station 3 - Upstream of Stebbins Island	Min	15.0	9.8	22.0	8.8	23.2	8.2	22.0	7.6	17.1	8.4	11.2	9.4
	Max	15.0	9.8	22.0	9.0	25.5	8.6	25.0	10.2	24.2	10.2	16.5	11.0
	Mean	15.0	9.8	22.0	9.0	24.0	8.5	23.3	8.4	19.9	9.2	13.4	9.8
	N	1	1	4	4	12	12	10	10	11	11	8	11

Source: Vermont Yankee 2006

Table 1-B
Water Quality Data from Vermont Yankee – 2005

	Month	May		June		July		August		September		October	
Sampling Station	Statistic	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l
Station 5 - Upstream of Vermont Yankee	Min	10.1	10.9	24.0	7.2			25.6	7.5	24.0	8.0	19.0	8.8
	Max	10.2	11.5	25.7	8.1			25.6	7.5	24.5	9.1	20.5	9.6
	Mean	10.2	11.2	24.9	7.7			25.6	7.5	24.3	8.6	19.8	9.2
	N	4	4	4	4	0	0	2	2	4	4	4	4
Station 4 - Between VY and Vernon Dam	Min	12.0	10.5	25.0	6.6					25.0	7.2	20.0	9.0
	Max	12.0	10.5	25.0	6.6					25.0	7.2	20.0	9.0
	Mean	12.0	10.5	25.0	6.6					25.0	7.2	20.0	9.0
	N	2	2	2	2	0	0	0	0	2	2	2	2
Vernon Dam Tailrace - NH Side	Min	8.0	12.6	25.1	7.7	25.0	7.1	25.0	7.0	20.0	8.0		
	Max	8.0	12.6	25.1	7.7	26.0	9.0	27.0	14.0	25.0	8.6		
	Mean	8.0	12.6	25.1	7.7	25.5	8.1	26.0	10.5	22.7	8.2		
	N	2	2	2	2	4	4	4	4	6	6	0	0
Station 3 - Upstream of Stebbins Island	Min	8.0	13.5	14.6	7.5	25.0	7.5	25.0	7.0	20.0	8.0	19.0	9.4
	Max	8.0	13.5	25.0	9.8	26.0	9.2	27.0	14.0	25.0	9.0	19.0	9.4
	Mean	8.0	13.5	18.8	8.9	25.5	8.4	26.0	10.7	22.0	8.3	19.0	9.4
	N	2	2	5	5	4	4	9	9	9	9	3	3

Source: Vermont Yankee 2006

**Table 1-C
Water Quality Data from Vermont Yankee – 2006**

	Month	May		June		July		August		September		October	
Sampling Station	Statistic	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l	Temp °C	DO mg/l
Station 5 - Upstream of Vermont Yankee	Min	10.1	11.4	14.5	7.8	22.0	8.0	23.4	8.0	18.8	8.0	11.4	8.4
	Max	12.5	12.0	21.0	10.0	24.5	8.6	27.0	9.2	20.2	11.5	14.7	10.5
	Mean	11.0	11.6	17.6	9.3	23.2	8.3	24.7	8.2	19.7	9.3	13.2	9.3
	N	12	12	32	32	16	16	23	23	18	18	22	22
Station 4 - Between VY and Vernon Dam	Min	12.5	11.0	16.6	8.2	26.5	7.5	27.2	7.2	21.0	7.6	13.9	8.6
	Max	13.5	11.6	21.4	9.2	27.3	8.2	28.4	7.7	25.1	8.6	19.5	9.9
	Mean	13.2	11.2	18.8	8.6	26.9	7.9	27.9	7.4	23.0	8.1	17.0	9.1
	N	6	6	16	16	8	8	10	10	10	10	11	11
Vernon Dam Tailrace - NH Side	Min			21.2	8.7	20.4	7.9	23.1	7.0	18.5	8.1	15.8	9.1
	Max			21.8	9.0	25.0	8.1	24.0	8.7	20.6	8.4	15.9	9.5
	Mean			21.5	8.9	22.7	8.0	23.6	7.9	19.9	8.2	15.9	9.3
	N	0	0	4	4	4	4	4	4	6	6	4	4
Station 3 - Upstream of Stebbins Island	Min			19.6	8.4	20.3	7.4	22.7	7.0	18.5	7.7	15.8	8.4
	Max			21.4	9.1	24.9	8.7	26.5	8.5	21.1	8.0	16.9	9.2
	Mean			20.6	8.7	21.7	8.3	25.0	7.6	20.2	7.9	16.4	8.8
	N	0	0	7	7	7	7	7	7	9	6	7	7

Source: Vermont Yankee 2006

A 2004 water quality assessment by DES (Connecticut River Joint Commissions and DES, 2004), conducted in the Connecticut River upstream and downstream of the Vernon Project (to a point in Massachusetts about 8 miles downstream) also documented that these reaches fully met the criteria for Class B waters at that time.

Water quality data is also available from the USGS gage at North Walpole, about 30 miles upstream of the Vernon dam. These data are somewhat sporadic and are reported as single values, collected once or more frequently per month on some but not all months, dating back to 1954. Table 2 contains data reported between 2002 and 2004. These data illustrate the seasonal variability in water temperature, river flow, and DO and do not show any violations of water quality standards for DO.

Table 2
Water Quality Data - Connecticut River at North Walpole, NH

Date	Water Temp. (°C)	River Flow (cfs)	Dissolved Oxygen (mg/l)
12/11/2002	1.1	1,290	--
1/6/2003	.2	4,200	13.1
2/3/2003	.1	5,350	14.0
3/17/2003	.5	1,560	13.9
3/27/2003	--	41,600	--
4/2/2003	2.0	40,000	13.5
4/9/2003	2.0	10,300	12.9
4/15/2003	6.2	23,200	12.3
4/29/2003	9.0	19,800	10.9
5/12/2003	11.5	12,800	9.9
6/17/2003	18.5	11,500	9.1
7/15/2003	23.9	5,360	7.3
8/19/2003	25.0	6,520	7.7
9/8/2003	20.4	1,800	8.5
10/8/2003	12.1	5,300	9.7
11/3/2003	10.0	14,700	10.9
12/10/2003	.2	10,400	13.6
1/13/2004	0	9,000	13.9
2/2/2004	0	6,220	14.3
3/1/2004	.5	7,600	14.8
3/31/2004	--	26,000	--
4/5/2004	--	34,000	--
4/13/2004	5.4	12,100	12.2
5/3/2004	13.2	9,570	10.3
6/8/2004	16.7	7,310	9.5
7/20/04	22.4	6,080	7.7
8/10/2004	23.0	1,610	7.5
9/7/2004	20.5	5,680	7.9

Source: USGS, 2006b, Gage # 01154500

5.0 MONITORING PROGRAM

This proposed water quality monitoring program for the Vernon Project seeks to minimize duplication of data by leveraging the extensive dataset available from VY's ongoing water quality monitoring program. TransCanada proposes that the VY data be considered adequate documentation of DO and temperature baseline conditions at Vernon, prior to installation of the four new generating turbines.

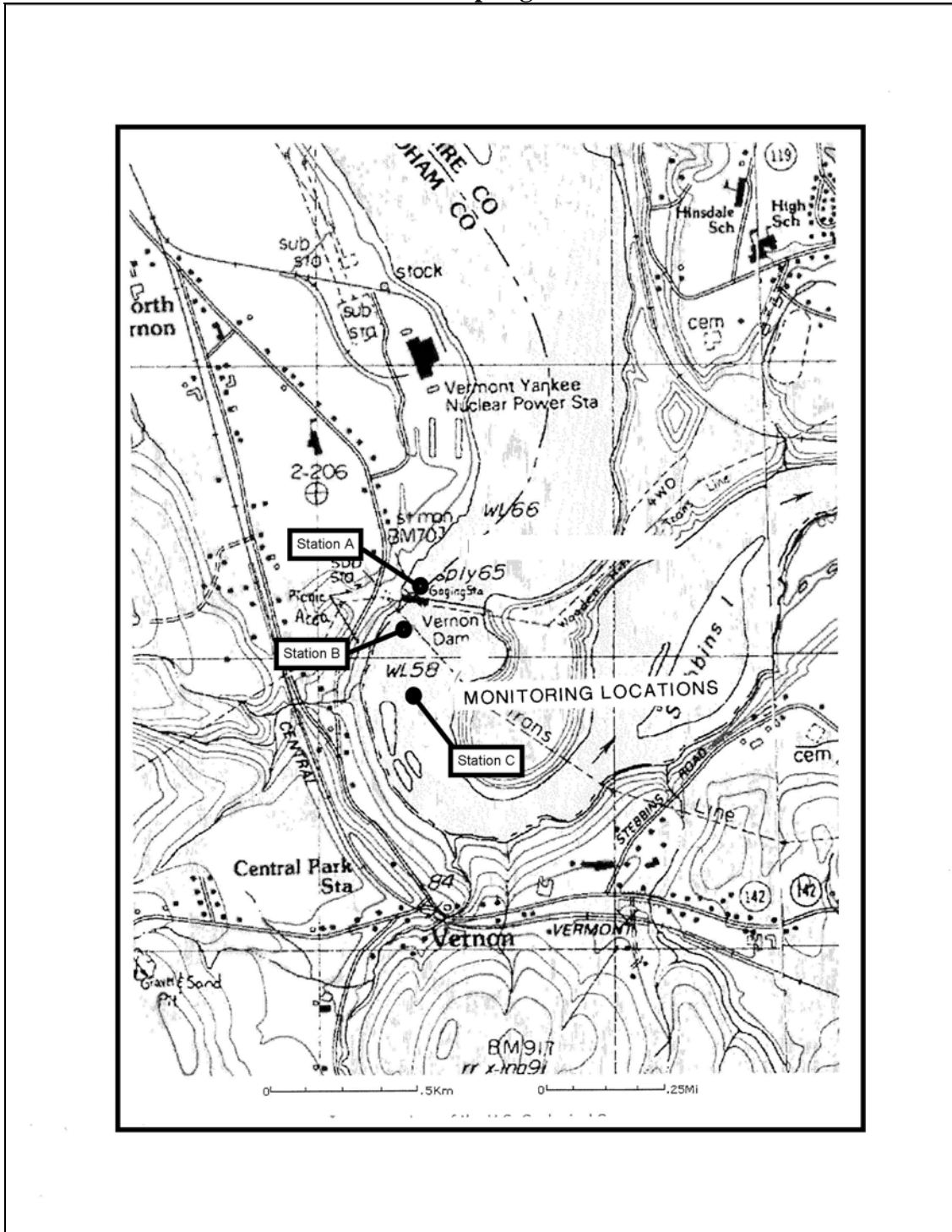
Grab samples DO (mg/l and % saturation) and temperature will be collected both upstream and downstream of Vernon Dam. Ideally, sampling events will be conducted at times when the new turbines are operating and when limiting water quality conditions are likely to exist. These periods typically occur during late summer when river flows can be low and ambient temperatures can be relatively high. If applicable Class B water quality standards for DO downstream of the Vernon Project are met under these conditions, it is reasonable to assume that operation of the new turbines does not adversely affect applicable water quality standards.

5.1 Monitoring Stations

Three stations will be established, one upstream and two downstream of the Vernon Project (see Figure 2). Station A will be located immediately upstream of the powerhouse at the upstream terminus of the downstream fish guidance structure. The downstream station B will be located approximately 100 meters downstream of the powerhouse. Station C will be located adjacent to the downstream tip of an un-named island, about 350 meters downstream of the dam and powerhouse at the mid-point of the channel.

Although TransCanada believes river water at all three of these locations is well mixed, in response to a request from NHDES, The 2008 sampling at Station A will include temperature and dissolved oxygen profile information down to full depth of the reservoir. Temp/DO profiles will be presented to the NHDES and VTDEC before March 31 of the following year. Following the presentation of the information, further consultation with the Agencies prior to the 2009 sampling season will determine if the profile data collection should be continued for the second year of sampling. Operation of the new turbines also is expected to contribute to enhanced mixing downstream. Therefore, sampling at multiple depths in the water column downstream is not warranted, and a single, mid-depth temperature and DO reading would be representative of the entire water column at Stations B and C.

Figure 2
Vernon Sampling Stations



5.2 Sampling Devices

Monitoring will be conducted using standard field multi-parameter water quality meters that measure temperature, dissolved oxygen (DO), conductivity and depth. Equipment used for water quality monitoring will be a current model from a manufacturer of national reputation for such equipment. The specific monitoring equipment proposed will depend upon the selection of the study consultant contracted to conduct the monitoring program. Details and specifications of selected monitoring equipment will be provided to NHDES and VTDEC for approval, prior to the start of the monitoring program.

5.3 Quality Control Measures

The monitoring equipment proposed for this type of project typically utilizes “single-point” dissolved oxygen calculation, where a single data point is used for meter calibration. Following calibration, the meter will be tested using a zero dissolved oxygen standard solution to ensure that low dissolved oxygen levels are properly recorded. This check will be made at the beginning of each day and each time the meter is re-calibrated. If the check reveals that the meter reads greater than 0.2 mg/l for a zero dissolved oxygen standard, the meter will be recalibrated until that standard is met, or another meter will be calibrated and used in its place.

As applicable to the actual equipment selected for use, DO sensors will be calibrated using EPA-approved techniques - EPA Method 360.1 (Electrode Method) for meter operation; and EPA Method 360.2 (Modified Winkler Method) for meter checks. DO calibration will be checked at the beginning, middle and end of the day by lowering a Van Dorn bottle to the desired depth, taking a water sample at that depth, and analyzing the DO in that sample. For the determination of DO levels, the Modified Winkler Method will be employed, with a slight modification necessary for field equipment. If the DO level from the meter differs by more than 0.2 mg/l from the DO determined using the modified Winkler Method, field staff will make a determination whether to recalibrate the DO sensor or to continue sampling without recalibration.

Temperature sensors are calibrated by the manufacturer. Depth sensors are also calibrated by the manufacturer, but will be zeroed in the field according to the manufacturer’s instructions.

In response to a request from NHDES, a field replicate measurement will be taken after every 10th sample. A replicate measurement will be performed, exactly as the original sample (i.e., raise the water quality meter back to the surface, then re-immerses the meter to the depth of the original sample) at least once during each of the three annual sampling events. Therefore, a minimum of 13 measurements (12 official samples per schedule and 1 replicate QC sample) will be taken during each of the three annual sampling events.

6.0 IMPLEMENTATION SCHEDULE

6.1 Monitoring Schedule

A total of six monitoring events are proposed – one each in July, August, and September of 2008 and a second round of three events during July – September 2009. Each monitoring event will consist of four samples collected on the same day at each of the three stations. Samples will be collected during early morning between dawn and the onset of full powerhouse generation, at mid-morning, in early afternoon, and in late afternoon.

The actual dates of the monitoring events will be scheduled to be as representative as possible of normal summertime conditions, using the following metrics:

- Inflow estimates and forecasts monitored via Waterline.
- Operations Department scheduling of generation for the new turbines.
- Ambient river temperature upstream of the Project.

Upon consultation with and approval by NHDES and VTDEC, the start of monitoring program will be postponed to the summer of 2009 under the following conditions:

- If flows remain consistently high throughout the sampling period.
- If at least two of the new turbines are not scheduled to operate during this period (e.g. due to malfunction, scheduled outages, or low inflows).
- If continuous ambient river temperature data suggests that atypical temperature conditions persist throughout the sampling period.

6.2 Reporting

At the conclusion of the each year's monitoring, TransCanada will prepare a report detailing the monitoring program and submit it to NHDES and VTDEC. The report will include:

- A description of each monitoring event;
- A summary of weather conditions during each the monitoring event and over the monitoring period;
- A description of project inflow, discharge flows, and elevation in the reservoir during the monitoring period;
- Any changes to the monitoring methodology, and a justification for such changes;
- A description of the quality control measures implemented;
- Discussion and analysis of monitoring results, with emphasis on temperature, DO concentration and DO saturation profiles;

- Discussion of water quality deficiencies, if any, and analysis of any potential effects of project operations on these deficiencies;
- Recommendations pertaining to whether or not additional monitoring may be warranted and, if so, any proposed modifications to the monitoring plan; and
- Recommendations pertaining to any operational changes, if warranted.

In the event that any persistent project-induced water quality standard violations of temperature or DO occur, TransCanada will consult with the NHDES and VTDEC to address those violations. The intent would be to revise and implement the Plan prior to the following year’s late summer monitoring period. Then if the results of the following year of monitoring indicate that the proposed measures were successful, a final Water Quality monitoring report will be filed with the agencies and FERC, including revisions that reflect those changes. We would anticipate being required to continue such measures into the future.

After completion of the second year of monitoring, a final monitoring report will be distributed to NHDES and VTDEC by March 31 of the following year. The report will include details as described above along with any changes made to the Plan during or after the first year. In the event that concerns are expressed by the agencies regarding the monitoring methods or results, TransCanada will consult further with the NHDES and VTDEC to attempt to address these concerns prior to submitting the final report to the agencies and to FERC. Table 3 below details the program’s implementation schedule.

**Table 3
Implementation Schedule**

Implementation Task	Targeted Date
DO and temperature monitoring	July - September 2008 and July – September 2009
Analysis of each year’s Vernon and VY data	By February 28, 2009 and 2010
Submittal of annual monitoring report	By March 31, 2009, and 2010
Submit Revised WQ Plan (if needed)	By May 31, 2009
Submit Final WQ Monitoring Report	By May 31, 2010

APPENDIX A

AGENCY COMMENTS



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

December 19, 2007

Mr. John Ragonese
TransCanada Northeast Hydro Region
4 Park Street
Concord, NH 03301

Re: Vernon Hydroelectric Project: FERC No. 1904

Dear Mr. Ragonese:

New Hampshire Department of Environmental Services (DES) Watershed Management Bureau (WMB) has reviewed the draft Water Quality Monitoring Plan, draft Debris Disposal Plan, draft Erosion Monitoring Plan, draft Reservoir and Minimum Flow Operations and Monitoring Plan, and draft Downstream Fish Passage Monitoring Plan. The plans were received via electronic mail between November 20, 2007 and December 3, 2007. With the exception of the draft Downstream Fish Passage Monitoring Plan, all plans required review and approval by DES pursuant to DES 401 Water Quality Certification (401 Certification) 2006-008 issued on July 3, 2006 for the Project.

Please address the following comments and submit the revised plans to WMB for further review and final approval consistent with the requirements of 401 Certification 2006-008.

Water Quality

1. Section 5.1 describes monitoring stations. Station A may represent the deepest area of the river associated with the Project, based on data from the Vermont Yankee Generic Environmental Impact Statement (EIS) dated December 2006. The water depth near the west bank approximately 0.25 mile upstream from Station A is 39.1 feet. Please include water temperature/dissolved oxygen profiles for each sampling event at Station A, as only water temperature data are available in the EIS.
2. Section 5.3 describes QC checks for dissolved oxygen. Please include provisions for a field replicate measurement after every 10th sample. Take the replicate measurement exactly as the original sample (i.e., raise the water quality meter back to the surface, then re-immerses the meter to the depth of the original sample).

Debris disposal

1. The document notes that solid waste and hazardous waste will be managed and disposed of according to federal and state regulations. Please provide references for those regulations.

2. Section 5.0 describes the use of erosion and runoff controls to prevent discharges to the environment. Please provide examples of potential erosion and runoff controls and secondary containment structures.
3. Section 6.0 notes "New Hampshire...wetland authorities." Please revise as New Hampshire Department of Environmental Services Wetlands Bureau. Further, the text states that sediment sampling will occur if sediment contamination is suspected. Please revise the text to state that sampling will be conducted for all sediments dredged, particularly if the sediments are to be used on dry land as fill.

Erosion


Section 4.0 notes that the proposed monitoring program will remain consistent with the methods used in prior surveys. Please provide additional details on those methods.

Operations

1. The document does not describe specific statements relative to the avoidance, minimization, or control of lag times, nor were any contingency plans discussed relative to non-compliance with minimum flows. Please include a discussion of contingency plans and avoidance, minimization, and control of lag times, as required pursuant to 401 Certification 2006-008.
2. Please include provisions for changes to operations should violations of water quality standards for dissolved oxygen occur at the Project. This is required pursuant to Condition E-5 of 401 Certification 2006-008.
3. Page 3, Section 3.3 describes reservoir WSEL relative to the past eight years. Please discuss the representativeness of the eight years relative to future operations.
4. Please address the comments by the Vermont Department of Environmental Conservation via electronic mail dated December 19, 2007.

Thank you for providing the draft plans for WMB review. Please feel free to contact me if you have questions or wish to further discuss these comments. Thank you.

Very truly yours,



Paul Piszczek
Watershed Management Bureau

cc: Jeff Cueto, VANR (via electronic mail)
Gabe Gries, NH F&G (via electronic mail)
John Warner, USFWS (via electronic mail)

APPENDIX B

RESPONSE TO AGENCY COMMENTS

**Vernon Hydroelectric Project
Dissolved Oxygen and Temperature Monitoring Plan
Monitoring Plan**

Summary of Responses to Agency Comments

Agency Comment	Response
<p>NHDES_1: Section 5. I describes monitoring stations. Station A may represent the deepest area of the river associated with the Project, based on data from the Vermont Yankee Generic Environmental Impact Statement (EIS) dated December 2006. The water depth near the west bank approximately 0.25 mile upstream from Station A is 39.1 feet. Please include water temperature/dissolved oxygen profiles for each sampling event at Station A, as only water temperature data are available in the EIS.</p>	<p>Although TransCanada is not sure of the precise depth at Station A and believes the likelihood of significant depth-related differences in temperature and dissolved oxygen is low, it is willing to provide water temperature and dissolved oxygen profiles at that location.</p> <p>Section 5.1 has been revised to specify that sampling at Station A will include Temperature and Dissolved Oxygen profile information down to full reservoir depth. Temp/DO profiles will be presented to the NHDES and VTDEC before March 31 of the following year and the issue of whether or not it makes sense to continue collecting profile data for the remaining three sampling events in 2009 will be discussed prior to the actual field season in 2009.</p>
<p>NHDES_2: Section 5.3 describes QC checks for dissolved oxygen. Please include provisions for a field replicate measurement after every 10th sample. Take the replicate measurement exactly as the original sample (i.e., raise the water quality meter back to the surface, then re-immerses the meter to the depth of the original sample).</p>	<p>Section 5.3 has been revised to include a QC replicate measurement after every 10th sample.</p>