

NEW ENGLAND CLEAN POWER LINK
LAKE CHAMPLAIN CONSTRUCTION PHASE
WATER QUALITY MONITORING PROGRAM
JULY 14, 2015

1.0 Introduction

Suspended sediment and water quality sampling and monitoring (hereinafter referred to as “water quality monitoring”) will be conducted in Lake Champlain during the construction phase of the New England Clean Power Link (Project) during pre-installation route clearing and cable installation by jet plow and shear plow. Water quality monitoring will consist of collecting water samples for analysis of total suspended solids (“TSS”) and chemical constituents at specified station locations and field monitoring for turbidity and TSS. Water quality monitoring for physical and chemical constituents will take place over the entire cable route in Lake Champlain.

TDI-NE has prepared this “Lake Champlain Construction Phase Water Quality Monitoring Program” to outline the key elements of the water quality monitoring approach for in-lake route clearing and cable trenching installation. This program is subject to review and approval by VT Agency of Natural Resources (“VT ANR”) and it intended to incorporated as a condition into TDI-NE’s Vermont Lake Encroachment Permit and 401 Water Quality Certification.

2.0 Quality Assurance Project Plan

At least 160 days prior to in-lake construction, TDI-NE will submit a Lake Champlain Construction Phase Quality Assurance Project Plan (“QAPP”) to VT ANR. The Plan will be consistent with the approved Lake Champlain Construction Phase Water Quality Monitoring Program and will include, at a minimum, the following elements: identification of approved sampling and analytical equipment and methodologies; timing and frequency of sampling; target chemicals and substances for sampling; sample documentation and reporting requirements; water quality action thresholds; and corrective action requirements. The water quality action thresholds shall ensure protection of water quality and maintenance of applicable Vermont Water Quality Standard criteria. The corrective action requirements may contain a suite of actions including, but not limited to: slowing the pace of route clearing or cable installation, modifying equipment or techniques utilized, and/or pausing work.

This document will specify the quality assurance/quality control (“QA/QC”) procedures for the collection, analysis, reporting, and evaluation of data. The QAPP will provide general information and reference standard operating procedures (“SOPs”) applicable to the analytical sampling program. This information includes definitions and generic goals for data quality and required types and quantities of QA/QC samples. The procedures address field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; recommended corrective action requirements; and QA reporting specific to the analyses performed by the laboratories.

3.0 General Sampling and Monitoring Procedures

During pre-installation route clearing and cable installation by jet plow and shear plow, water quality will be monitored through water sampling at selected sampling stations and subsequent laboratory analysis.. A down-current station will be located approximately 500 feet down-current of the installation equipment to monitor water quality impacts associated with sediment resuspension due to route clearing and installation equipment. Monitoring will also be conducted at up-current control (i.e., background) stations located 500 feet from the installation equipment. Each sampling station will be oriented based on the direction of current flow as detected by an acoustic Doppler current profiler (“ADCP”).

An ADCP and combination Conductivity-Temperature-Depth profiler and Optical Backscatter Sensor (“CTD-OBS”) will be used to measure water column TSS and turbidity at the stations. Companion water samples will be collected and analyzed for TSS. The OBS will be mounted on a datasonde measuring conductivity (salinity), temperature, and depth. The laboratory derived TSS data will be used to calibrate the ADCP and OBS instrumentation during cable installation. Sampling and monitoring is expected to occur twice per day when Lake construction activities are underway, once in the morning and once in the afternoon. No monitoring will occur where conditions would create an unsafe work environment for personnel (e.g. severe weather event, low visibility).

4.0 TSS Monitoring

Sediment resuspension during cable installation will be monitored twice a day at stations oriented based on the direction of current flow. Real-time monitoring will consist of ADCP measurements and CTD-OBS profile measurements taken at the two stations. The first station will be established approximately 500 feet up-current of the operating jet plow/shear plow (or at reasonable safe survey distance up-current of the plow) to measure ambient or background TSS conditions. The down-current station will be established 500 feet down-current of the installation device or at a reasonably safe distance. At each station, the ADCP will provide horizontal and vertical profiles of current velocities and acoustic backscatter intensity at the point of measurement. A CTD-OBS vertical profiler system will be deployed and collected at the location where the highest acoustic backscatter intensity was observed by the ADCP.

Water samples for laboratory analysis of TSS will also be collected where the highest acoustic backscatter intensity was observed by the ADCP at three depths (near-surface, mid-depth, and near bottom). TSS samples will not be composited since the results will be used during installation to update calibration curves.

5.0 Water Quality Sampling

Water quality samples will be collected and analyzed for the chemical parameters identified in consultation with ANR. The expected list of metal parameters is provided in Table 1 below, as well as the acute standard for each. Sampling will also be completed for Total Phosphorus (“TP”) and Dissolved Phosphorus (“DP”).

Table 1. Metal Parameters and Vermont Water Quality Standards (ANR 2014)

Compound	Acute Standard (ug/L)
Arsenic	340
Cadmium	1.03
Copper	7.0
Lead	30.1
Mercury	1.4
Nickel	260
Silver	1.02
Zinc	65

As with TSS monitoring, water quality samples will be collected at stations located approximately 500 feet up-current and 500 feet down-current of the installation equipment. The location of the stations will reflect water movement patterns detected by the ADCP, which provides current direction and velocity. Samples will be collected at near-surface, mid-depth, and near-bottom at 500 feet up-current and down-current from the installation equipment at each sampling location. Water samples will be collected at the same location where the TSS water samples are taken (where the highest acoustic backscatter intensity was observed to the extent practicable in the field). An elevated level of care will be exercised during the collection of mercury samples to preclude contamination of either the samples or the field blanks.

Water samples for the required parameters will be sent to an accredited laboratory for analysis in accordance with the methods described in the QAPP. Concentrations of metals will be reported as both dissolved and total fractions except for mercury, which shall be reported as total mercury. Water samples will be delivered to the laboratory within 24 hours or in accordance with allowable holding times of the applicable method, whichever is shorter. Laboratory processing will be completed in 72 hours from laboratory receipt. The analytical results will be reviewed by TDI-NE and the results submitted to ANR via email within one day of receipt from the laboratory.

6.0 Regulatory Compliance

If, during underwater cable installation, (1) TSS concentrations monitored or measured at 500 feet down-current of the jet plow operation in Lake Champlain north of Crown Point exceed TSS concentrations at an up-current background station by more than 200 milligrams per liter (“mg/L”) at the corresponding depth; (2) TSS concentrations monitored or measured at 500 feet down-

current of the shear plow in Lake Champlain south of Crown Point exceed TSS concentrations at an up-current background station by more than 100 mg/L at the corresponding depth; or (3) laboratory results indicate that the acute standard for a chemical parameter has been exceeded, TDI-NE will immediately notify the on-board Environmental Inspector and notify ANR within 24 hours of any such exceedance. TDI-NE shall also immediately employ one or more of the following environmental protection measures: slowing the rate of advancement of the jet plow or shear plow, modifying hydraulic pressures, or implementing other reasonable operational controls that may reduce suspension of in-situ sediments. If TDI-NE proposes to employ mitigation measures not otherwise provided for in this document, they must first consult with ANR, and the Environmental Inspector. In the event that ANR determines that the mitigation techniques are unable to reduce TSS or chemical concentrations below the maximum allowable threshold, underwater cable installation shall be suspended and TDI-NE shall consult with ANR regarding alternative cable installation techniques. Nothing in this subsection is intended to require that cable installation methods be modified to prevent burial of the cables in a single trench to a target depth of three to four feet through a single installation pass.

7.0 Reporting

After completion of cable installation activities, a final report will be prepared that will include a description of procedures followed during the monitoring program, field data results, analytical testing data results, and accompanying QA/QC data. The final report will include the correlations between optical and acoustical backscatter data and corresponding TSS results from water samples. The report will also include a comparison of TSS results to pre-established thresholds and a comparison of water quality results to relevant VWQS criteria. The final report summarizing the results of the suspended sediment/water quality monitoring program will be submitted to the Vermont Public Service Board and ANR within one year of the completion of Lake cable installation.