STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Champlain VT, LLC d/b/a TDI New England for a Certificate of Public Good, pursuant to 30 V.S.A. §248, authorizing the installation and operation of a high voltage direct current (HVDC) underwater and underground electric transmission line with a capacity of 1,000 MW, a converter station, and other associated facilities, to be located in Lake Champlain and in the Counties of Grand Isle, Chittenden, Addison, Rutland, and Windsor, Vermont, and to be known as the New England Clean Power Link Project ("NECPL")	)	Docket No. _____

PREFILED DIRECT TESTIMONY OF ALAN WIRONEN

ON BEHALF OF CHAMPLAIN VT, LLC

December 8, 2014

Summary:

Mr. Wironen testifies on and introduces the Project plans that have been prepared for the NECPL, and provides testimony regarding construction and traffic issues as they relate to public health and safety, transportation systems, and development affecting public investments under 30 V.S.A. § 248(b)(5).

List of Exhibits

Exhibit Number	Name of Exhibit
TDI-AW-1	Resume
TDI-AW-2 (Oversized)	Project Plans – Overland Route (TRC)
TDI-AW-3 (Oversized)	Typical Construction Methods and Designs – Overland Route (TRC)
TDI-AW-4	Listing of Public Lands, Services, Facilities, and Public Waters (TRC)

Q1. Please state your name, occupation, and business address.

A1. Response: Alan M. Wironen, Engineer with TRC, 249 Western Ave, Augusta, ME.

Q2. What is your connection to TDI New England ("TDI-NE") and the New England Clean Power Link Project ("NECPL")?

A2. Response: I am a consultant for the NECPL responsible for developing the Project route, permit level design documents and select studies.

Q3. Please describe your qualifications and expertise.

A3. Response: I am a Civil Engineer by education and a practicing engineer with over 33 years of experience. I am a retired Navy Civil Engineer Corps Officer, former owner/partner in an engineering firm that specialized in bulk fuel storage, distribution and handling. In my career I have provided engineering, design, consulting, construction management and inspection services over most of the globe. Specific work has included, tank and piping inspection, industrial coating inspection, high voltage electric substation, pipeline installation, airports, roads, sewer systems, waterfront facilities, buildings, fuel farms and other facility construction. Most recently I served as the primary technical consultant for the Champlain Hudson Power Express Project, a 330-mile high voltage direct current (HVDC) project located in New York. My resume is attached as ***Exhibit (Exh.)TDI-AW-1***.

Q4. Have you previously testified before the Public Service Board or in other judicial or administrative proceedings?

A4. Response: Yes, in New York State but not in Vermont.

Q5. What is the purpose of your testimony?

A5. Response: I testify on and introduce the Project plans that have been prepared for the overland route of the NECPL, and provide testimony regarding public health and safety as it relates to the Project design and construction, transportation systems, and development affecting public investments under 30 V.S.A. § 248(b)(5).

Q6. What work have you performed concerning the NECPL that is covered in your testimony, including work performed under your supervision?

A6. Response: I am the lead engineer responsible for developing the installation details and route for the permit level design of the proposed overland portion of the transmission system in Alburgh and from Benson to Ludlow. Under my direction the proposed Converter Station layout, typical cable installation details and traffic control typicals were developed. I have represented TDI-NE at numerous outreach meetings and with VTrans as well as local Road Commissioners as the lead engineer for the overland portion of the Project.

Q7. Please list the specific plans and other document prepared by you or others at TRC that are being submitted by you as exhibits for this Project.

A7. Response: My list of exhibits is as follows: ***Exh. TDI-AW-2***: Project Plans – Overland Route, ***Exh. TDI-AW-3***: Typical Construction Methods and Designs – Overland Route, and ***Exh. TDI-AW-4***: Listing of Public Lands, Services, Facilities, and Public Waters.

Q8. Have you relied on the work of any other experts concerning your work on the NECPL?

A8. Response: Yes, as stated above, the cable burial depth within Lake Champlain were done by other staff within TRC. In addition, I have consulted with directional drilling experts regarding the use of horizontal directional drilling ("HDD") rather than trenching for portions of the overland cable installation. Additionally, Lake Champlain sediment data and sample correlation relied on work by HDR Engineers and Marine Resource Corporation, respectively. Lastly, Encompass Services performed the LiDAR route survey used to develop the Project maps including the high resolution imagery of the route.

Q9. Have you provided information to other experts in support of their work on the NECPL, and if so, what?

A9. Response: Yes. Our Lake Champlain burial depth estimate was provided to Exponent through TDI-NE for use in evaluating potential thermal impacts in Lake Champlain. Similarly, sketches of a proposed bridge attachment and culvert headwall attachment

installation were provided to Exponent for estimating magnetic fields associated with these two installation methods. We also provided AutoCAD files of the proposed Converter Station general arrangement and site plan to both RSG Inc. and T J Boyle for use in the sound and visual impact studies, respectively.

Q10. Please identify and describe the Project-related plans or studies that you have prepared, or that have been prepared under your supervision.

A10. Response: I developed or directed the development of the overland cable route in Alburgh and from Benson to Ludlow, Vermont following a right of way route selected by TDI-NE. That ROW includes municipal roads in Alburgh, Benson and Ludlow, state roads (Route 22A, 4, 7, 103 and 100); and a three mile segment of railroad. I also developed the proposed installation methods and related installation details. Refer to *Exhs. TDI-AW-2 and TDI-AW-3*.

In the process of developing the cable route, I looked at a number of route options, construction methods and installation alternatives in an effort to provide a route where the cable could be installed while minimizing potential risk for the Project, the environment, and the public. This has included multiple days of field work along the route which has helped me develop the overland route so as to allow for construction while balancing environmental and other concerns.

Q11. Please describe the design criteria utilized to develop the overland portion of the cable route for the NECPL.

A11. Response: Design criteria applied to the overland portion of the Project route has evolved as the work progressed after receiving input from other parties including State agencies and towns. General criteria included the following, but deviation has been permitted under certain circumstances:

- Stay within existing public right of way;
- Keep to extreme edge of cleared right-of-way wherever practical;
- Install cable in highway "clear zone" wherever practical;
- Limit tree cutting. Tree cut areas must include avoidance of Indiana Bat habitat to the extent practical;
- Install cable in road shoulder only where other alternatives are impractical, subject to approval by VTrans;
- Install cable in travel lane only where other alternatives are infeasible subject to approval by VTrans;
- Locate cable in areas unlikely to cause impact on future improvements, such as culvert replacements;
- Go under existing utilities where feasible;
- Cable may be routed closer than 45 feet to major structure and foundation but requires VTrans concurrence;
- HDDs to be straight run (2-D) bores to the greatest extent possible;
- HDD entry angle 12 to 18 degrees, exit angle 10 to 12 degrees;
- Avoid open cut in high value wetlands;

- Avoid other wetlands unless no other alternative;
- Route cable around culverts where feasible;
- Avoid steep side slopes;
- Blasting of rock along VTrans ROW is not forbidden;
- No open cut across highways, railroads or other paved streets;
- Do not hang cable from VTrans bridges;
- No impact or easements on private property;
- Plan for vehicle access to all property along route without crossing private property.

30 V.S.A. § 248(b)(5) -- Public Health and Safety; Transportation Systems

Q12. Please identify the types of potential impacts related to public health and safety and transportation systems (road and railroad) associated with construction of the overland portion of the cable route.

A12. Response: Construction of the transmission line within existing road and railroad ROWs may results in the following impacts:

- Traffic delays;
- Traffic congestion at work sites;
- Construction equipment noise during construction;
- Road surface damage due to heavy construction traffic;
- Ground vibration associated with rock removal including blasting.

Q13. Please identify generally the types of potential impacts related to public health and safety and transportation systems (road and railroad) associated with the ongoing operation and maintenance of the overland portion of the cable route.

A13. Response: Under normal circumstances there should be no impact. Once the cables are buried, there will be no interference with transportation networks. Periodic inspections of the transmission line ROW and vegetative maintenance activities will not disrupt traffic or have any of the other potential impacts that are associated with construction.

Q14. Please explain how the proposed overland route of the NECPL addresses potential impacts to public health and safety, potential traffic-related impacts, and potential environmental impacts during the construction phase.

A14. Response:

Public Health and Safety

The overland installation has been designed to follow existing road corridors. The design strives to install the cable off of the traveled way (or travel lane), in what is commonly referred to as the roadway clear zone or safety zone. Construction in this area will allow the cable trench to be off of the paved roadway, providing a buffer between the trench and travelling public. This buffer will also be used for construction access.

Along much of the route, the shoulder and clear zone is very narrow with trees, rock outcrops and utility poles immediately adjacent to the travel lane. Installation within the shoulder and clear zone will minimize or eliminate these potential hazards to motorists.

TDI-NE is committed to ensuring access to each residence and commercial building that is located along the route throughout the construction period. Access will be provided using detours around the work, temporary access lanes and by plating over the trench at driveway and road crossings. Access to dwellings is critical for medical emergencies, fire and general well-being of the occupants.

Road detours, road and lane closures will be designed and marked in accordance with the Manual on Uniform Traffic Control Devices. This topic will be discussed further below. In addition, the construction site will be marked and barricaded to meet federal, state, municipal and VTrans safety requirements.

TDI-NE anticipates work along the state roadways will be restricted during winter months in accordance with VTrans construction policies.

TDI-NE also anticipates work in residential areas will be restricted during nighttime hours and other measures may be required to reduce general construction noise. These practices will contribute to good public relations and general well-being for those residents along the Project route. In general, construction work will only occur for four to five days in front of any given residence. The actual duration in any one residence may be extended should ledge, high water table or other complications be encountered.

Where ledge exists along the proposed route, removal will be accomplished using standard construction equipment where practical. Very dense and lightly weathered rock may have to be removed with explosives. When explosives are necessary, the blasting operation will be done by licensed blasters following a work plan developed for the Project and approved by the PSB. See the prefiled testimony of

Jessome/Martin/Bagnato and ***Exh. TDI-JMB-10***. The blasting plan includes limits on ground motion, and noise. It also requires pre and post blast surveys, and ground and atmospheric monitoring.

Traffic Impacts

Work along the proposed route will involve lane closures, lane reductions, road closures and other potential traffic inconveniences. As indicated above, TDI-NE will ensure each residence and business along the route will have access during the construction. Work along narrow municipal roads may require the roads be restricted to one lane and closed to all but local traffic. In Alburgh, Benson and Ludlow, properties will be reachable following alternate routes, or detours.

All detours, road closures and lane restrictions and other traffic pattern changes will be coordinated with the local municipality, emergency services, VTrans, and Green Mountain Railroad. Use of flaggers, road signs, construction barricades and similar traffic control devices will be designed, maintained and operated as required by applicable regulations, including the Manual of Uniform Traffic Control Devices.

TDI-NE intends to strictly control construction traffic volume and speed. One method to control construction traffic volume is to establish staging and storage areas along the Project route. These areas will serve as parking areas for construction worker vehicles, and limit the distance construction vehicles must travel during peak traffic periods to pick-up or drop-off material and equipment.

Traffic impacts will also be minimized by scheduling oversize/overweight deliveries during non-peak and night-time hours if preferred by the State transportation authorities. Similarly, when work along a road segment requires extended traffic

interruptions, within limits of the approved permits, oversized/overweight deliveries will be scheduled during night-time hours if preferred by the State transportation authorities.

Instead of continuing along a congested, narrow segment of Route 103 in Cuttingsville, a 3.5 mile segment of the Project route was modified to follow an existing railroad corridor. This route modification was pursued to:

- Limit traffic impacts within the historic village of Cuttingsville;
- Avoid roadway choke points;
- Avoid work within densely populated communities;
- Avoid areas prone to flooding.

Environmental Impacts

The Project route, installation methods and design have been developed with the goal of minimizing both permanent and temporary environmental impacts. The most fundamental criteria established for the route selection is that the Project will follow established road or railroad corridors. Adherence to this criteria allows the cable to be installed with minimal forest destruction, stream alteration and temporary construction access roads.

The cable system installation has been routed around most wetland areas. Where wetlands could not be avoided, the installation location will be restored to its original condition at the completion of the construction to the extent feasible. Tree removal has been minimized to the extent feasible, and those trees that will have to be cut have been evaluated for Indiana bat roosting and other natural environments.

Other environmental impact mitigating measures include the use of "trenchless" technology for major stream crossings, employment of extensive erosion control

measures and other common control such as water bars, temporary seeding of exposed soil, use of "dirt bags" to limit turbidity and other such methods as outlined in the Vermont Standards & Specifications for Erosion Prevention & Sediment Control.

Q15. Given the information you provided above, including the Project design and mitigation measures, will the NECPL cause unreasonable congestion or unsafe conditions with respect to transportation systems (public roads or railroad rights-of-way) during its construction? During its operation? Please explain.

A15. Response: The Project work will not expose the public or its workers to unreasonable or unsafe conditions during construction or operation. The primary impacts associated with the Project would be associated with the construction-related activities adjacent to roadways and, to a lesser extent, railroads. Traffic speeds will likely be reduced temporarily where there is construction but the overall traffic impacts along these routes will be minimal. Standard construction methods will be employed along the route, following established safety standards and work practices. It in the interest of TDI-NE to ensure the construction and operation of the system is carried out in a safe manner in compliance with current safety standards. As with any construction work along a road system, some traffic delays will be unavoidable. These impacts will be minimized through use of public communications (meetings, internet, radio, newspapers), close coordination with VTrans, Green Mountain Railroad, municipal leaders, and others. Unreasonable congestion will be avoided.

Q16. Given the information you provided above, including the Project design and mitigation measures, will the NECPL cause any undue adverse impacts to public health and safety during its construction? During its operation? Please explain.

A16. Response: The Project construction and operation will not expose the public to undue adverse impacts to health or safety. All applicable precautions required by law and regulation as well as other reasonable supplementary precautions will be applied during the construction and operation of the system. Specific VTrans materials that will be reviewed include but not limited to: (i) Work Zone Safety and Mobility Guidance Document; (ii) Work Zone Safety and Mobility Temporary Traffic Control Devices; (iii) VTrans Construction Manual – Section X: Safety; and (iv) Operations Safety Manual. TDI-NE would also adhere to the standards laid out in the Federal Highway Administration's Manual on Uniform Traffic Control Devices.

TDI-NE has expended considerable time and effort to identify potential impacts including impacts to the natural environment, radiological fields, noise and other phenomena of concern. In each case, the phenomena studied proved to be below established standards, or mitigating measures were applied to ensure compliance with established standards.

10 V.S.A. § 6086(a)(1)(A) – Development Affecting Public Investments

Q17. Please identify the public lands, public services or public facilities, or public waters that are adjacent to the proposed NECPL.

A17. Response: I am submitting as part of my testimony ***Exh. TDI-AW-4***, which provides a listing of these features. The majority of these features are road crossings (69) and

railroad crossings (3). In terms of conserved public lands, portions of the Project route are adjacent to the Blueberry Hill Wildlife Management Area, and in close proximity (within 100 feet) to Mount Independence, the Appalachian Trail Corridor and Green Mountain National Forest Trail, the Otter Creek Stream Bank, and Okemo State Forest. The Project will also cross Otter Creek. There are nine (9) recreational areas within 500 feet of the Project route, four of which are located on the shoreline where the cables would be installed in Lake Champlain. Similarly, there are two fishing areas in the southern part of the lake which are within approximately 350 feet of the proposed route.

Q18. Given the information you provided above, including the Project design and mitigation measures, will the Project unnecessarily or unreasonably endanger the public or quasi-public investment in adjacent lands, services, or facilities, or materially jeopardize or interfere with the public's use and enjoyment of those lands, services, or facilities? Please explain.

A18. Response: No adverse impacts are anticipated. During installation of the Lake and overland portions of the Project, there may be some impacts on existing vessel and traffic patterns. These impacts will be localized and of a relatively short duration, so there will be no material disruption in the public's use and enjoyment. After construction is completed, the construction area will be restored and the only indication of the presence of the transmission system will be the permanent Project corridor along the overland road/railroad ROWs.

Q19. Does this conclude your testimony at this time?

A19. Response: Yes it does.