

**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 KENNETH KALISKI
ON BEHALF OF CHAMPLAIN VT, LLC**

December 8, 2014

Summary:

Mr. Kaliski testifies regarding the potential noise impacts of the NECPL, and compliance with 30 V.S.A. § 248(b)(5) (aesthetics – noise). Mr. Kaliski concludes that the NECPL will not have an undue adverse impact on aesthetics, based upon sound monitoring and sound propagation modeling for the proposed Converter Station in Ludlow. In addition, construction should not cause an undue adverse impact due to its temporary nature, scheduling, and the relatively isolated location of the Converter Station.

Exhibit Number	Name of Exhibit
TDI-KK-1	Resume
TDI-KK-2	Noise Impact Assessment for Converter Station (RSG)
TDI-KK-3	Noise Primer (RSG)

1 **Q1. Please state your name and position relative to this Project.**

2 A1. Response: My name is Kenneth Kaliski. I am a Senior Director at Resource Systems
3 Group, Inc. (RSG) of White River Junction, Vermont. I am the noise control engineer
4 for the Project.

5
6 **Q2. Please describe your qualifications and expertise.**

7 A2. Response: I have worked at RSG for 28 years with 15 years on its Board of Directors.
8 My current position is Senior Director, in charge of the Acoustics and System Dynamics
9 group at the company. I am a Professional Engineer with licenses in Vermont, New
10 Hampshire, Massachusetts, and Michigan. I am Board Certified through the Institute of
11 Noise Control Engineering (INCE). At INCE, I have served on its Board of Directors
12 and as Vice President for Board Certification. I am currently on its Board Certification
13 Committee, which is responsible, in part, for review applicants for Board Certification. I
14 am a member of the Acoustical Society of America and serve on its Noise Committee. I
15 am a Qualified Environmental Professional as certified through the Institute of
16 Environmental Practice.

17 My resume is attached as *Exhibit (Exh.) TDI-KK-1*.

18

19 **Q3. On whose behalf are you offering this testimony?**

20 A3. Response: I have been retained by Champlain VT, LLC d/b/a TDI New England
21 (“TDI-NE”) concerning the proposed New England Clean Power Link Project
22 (“NECPL” or “Project”).

23

1 **Q4. What is the purpose of your testimony?**

2 A4. Response: I testify regarding the potential noise impacts of the NECPL, and
3 compliance with 30 V.S.A. § 248(b)(5) (aesthetics – noise). In summary, I conclude that
4 the NECPL will not have an undue adverse impact on aesthetics with respect to noise. I
5 base this conclusion on sound monitoring and sound propagation modeling for the
6 proposed Converter Station in Ludlow, which indicates the highest sound level at a
7 residence of 35 dBA with all Project equipment operating at maximum capacity.
8 Construction of the power line will not have an undue adverse impact because activity in
9 front of any single home is expected to be limited to five days or less. Construction of
10 the Converter Station will not have an undue adverse impact because the activities that
11 make the most noise (land clearing, drilling and blasting, grading, and building shell
12 construction) are expected to take no more than one year and will be limited to 7 am to
13 7 pm weekdays and 8 am to 5 pm on Saturdays, excluding holidays.¹

14

15 **Q5. Have you previously testified before the Public Service Board or in other judicial**
16 **or administrative proceedings?**

17 A5. Response: Yes, I have testified before the Public Service Board in several dockets,
18 including Green Mountain Power's Kingdom Community Wind, Georgia Mountain
19 Community Wind, and VELCO's Northwest Reliability and Southern Loop projects.

20

21

22

¹ Blasting will be limited to weekdays from 8 am to 5:00 pm, except in emergencies

1 **Q6. What work have you performed concerning the NECPL?**

2 A6. Response: We have conducted background sound monitoring at sites around the
3 proposed Converter Station and sound propagation modeling to forecast the sound
4 levels of the converter at neighboring residences. The details of our work are discussed
5 in my NECPL Converter Station - Noise Impact Assessment Report, which is provided
6 as *Exh. TDI-KK-2*. We also prepared a Noise Primer, which provides a brief
7 explanation of the principles of sound, including how it travels and how it is measured.
8 See *Exh. TDI-KK-3*.

9

10 **Q7. Did you prepare the report and testimony yourself?**

11 A7. Response: Yes, with the assistance of other RSG staff who are under my supervision and
12 direction.

13

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

15 A8. Response: Yes. I have worked with staff from TDI-NE and their external Converter
16 Station engineers and Al Wironen from TRC and his staff on the Converter Station
17 design.

18

19 **Q9. Have you provided Project information to other experts in support of their section**
20 **248 testimony and if so, what?**

21 A9. Response: No.

22

23

1 **Q10. What sound sources at the Converter Station did you consider?**

2 A10. Response: The most significant sound sources from the Converter Station include:

- 3 • The equipment inside the Converter Station – This will be controlled by the shell
4 of the Converter Station, but we have assumed some breakout noise will occur.
- 5 • The exterior transformers – There will be three 350 MVA single phase
6 transformer with cooling fans in the yard of the station. These will operate
7 continuously.
- 8 • Valve coolers – There will be banks of dry coolers outside the building. The fans
9 on these coolers generate sound.
- 10 • HVAC – There will be HVAC units to cool the building.
- 11 • Emergency generator – The emergency generator will only run during power
12 failures and periodic exercising.

13

14 **Q11. Please summarize the investigations you conducted regarding the proposed**
15 **Converter Station in Ludlow.**

16 A11. Response: We conducted sound monitoring at three locations around the Converter
17 Station site during one week in late Fall, 2014. The three were representative of the
18 closest homes to the north, southwest, and east of the site. We then collected
19 information on the potential layout of the Converter Station site and sound sources
20 within the site. With that information, we conducted sound propagation modeling to
21 estimate the potential for noise impacts to occur at residences surrounding the Converter
22 Station site.

1 Modeling was first done on a TDI-NE parcel to the northwest of the current site
2 under various building and terrain configurations. The site was higher in elevation,
3 making it more difficult to mitigate noise impacts. The proposed station was then moved
4 to its current location. Sound was first modeled with no mitigation, then runs were done
5 with a combination of mitigation options to demonstrate the noise goal for the Project
6 could be met.

7
8 Project Operations

9 **Q12. What are the principal sources of noise that will be generated by operation of the**
10 **NECPL?**

11 A12. Response: The major noise generators will be the transformers and valve cooling fans.
12 Other, minor sources will be building air conditioning and breakout noise from the
13 equipment inside the Converter Building. There is also a diesel backup generator that
14 will only run during black-outs.

15
16 **Q13. What sources of background noise exist at or near the Project corridor, and what**
17 **effect to they have?**

18 A13. Response: As detailed in my report (*Exh. TDI-KK-2* at pp. 13 to 17), background
19 sounds include birds, insects, wind, and an occasional vehicle passby. At some locations,
20 sound from the existing VELCO Coolidge substation can be observed at a relatively low
21 level during portions of a quiet night
22

1 **Q14. Based on your analysis, what are the forecasted sound levels at the closest**
2 **residences to the Converter Station during its operation?**

3 A14. Response: As detailed in my report (*Exh. TDI-KK-2* at p. 21), based on our modeling,
4 sound levels do not exceed 35 dBA (Leq_(1-hour)) at the exterior of any residence, with all
5 Converter Station sources (except the emergency generator) on and at their maximum
6 sound output.

7

8 **Q15. How do these modeled sound levels compare with existing background levels**
9 **and other common activities?**

10 A15. Response: As detailed in my report (*Exh. TDI-KK-2* at p. 28), the modeled sound
11 levels are about the same as the nighttime Leq measured over the course of one-week
12 during leaf-off conditions. They are higher than the 10th percentile (L90) measurements
13 during the same period. Relative to other common activities, I have included a “Noise
14 Primer” as *Exhibit TDI-KK-3* which provides more detail on the sound levels of other
15 common environments and activities. As shown in Figure 2 of the Noise Primer, 35
16 dBA is comparable with a modern library or a quiet rural area.

17

18 **Q16. What regulatory noise limit did you use in your analysis, and how did the**
19 **modeled sound levels compare?**

20 A16. Response: RSG recommended and TDI-NE concurred with establishing a noise goal of
21 35 dBA L_{night} for tonal sound sources and 40 dBA L_{night} for other continuous sound
22 sources. This is more conservative (i.e., more protective) than the WHO Nighttime
23 Noise Guideline for Europe of 40 dBA L_{night, outside}. It is also more conservative than the

1 ANSI S12.9 compatibility standard for residences of 55 dBA (annual average), adjusted
2 down to account for tonality (-5 dB) and nighttime use (-10 dB), resulting in 40 dBA.

3 While not applicable to this Project, it is also lower than the Ludlow Zoning Standard of
4 not to exceed 65 dBA for eight hours of 24, and not to exceed 70 dBA at any time, as
5 measured at a residential property line. Regulatory noise standards are discussed in my
6 report, *Exh. TDI-KK-2* at pp. 6-8.

7
8 Project Construction

9 **Q17. What are the principal sources of noise that will be generated by construction of**
10 **the NECPL?**

11 A17. Response: Installation of the cable will use ships and barges in Lake Champlain and
12 diesel excavating equipment for on-land installation. These may include excavators,
13 loaders, ditch diggers, drilling, and blasting. For the construction of the Converter
14 Station, equipment will be used to clear the land, excavate the foundation, and construct
15 the building, equipment, and roads.

16
17 **Q18. How have you assessed Project-related noise due to construction?**

18 A18. Response: With respect to the overland cable, construction work will only last about five
19 days in front of any one home on average and is temporary. Longer durations in front
20 of any residence is possible where rock, high water table or poor weather delay the work.
21 Where TDI-NE is conducting horizontal drilling, it may continue the drill up to 24
22 hours per day, including weekends and holidays, as necessary to complete a drill. If this is
23 necessary, neighbors will be given 24-hours' notice of the activity. Line installation in

1 Lake Champlain may occur throughout both the day and night, seven days per week, but
2 will be continuously moving (on the order of an average of one mile per day) and
3 generally distant from residences. We thus concluded that the short-term noise from the
4 installation of the overland and Lake cables does not have the potential to cause undue
5 adverse impacts.

6 We have assessed noise from construction of the Converter Station, as that work
7 will occur in the same location for a sustained period of time (approximately 24 months).
8 Based on my discussions with Alan Wironen, the major exterior construction duration is
9 broken out as follows:

- 10 • Clearing the site is expected to take six weeks, and will include grubbing and
11 stripping soil.
- 12 • Drilling and blasting, including the removal of overburden and crushing of
13 rock on site, is expected to take 12 weeks.
- 14 • Rough grading the site is expected to take two weeks.
- 15 • Construction of the building foundation, including excavation, is expected to
16 take 20 weeks. Additional blasting may be required as excavation progresses.
- 17 • The building exterior will be completed in 12 weeks.

18 The remaining construction, including interior work and site commissioning is
19 expected to take another 12 months. No substantial noise impact is expected during this
20 time.

21 Equipment used for Converter building construction will be varied. Some of the
22 louder pieces of equipment are shown in the following table along with the approximate
23 maximum sound pressure levels at a reference distance of 50 feet (15.2 m) and 1,150 feet

1 (349 meters), which is the distance from the closest residence to a Converter Station site,
 2 where the majority of construction activity will occur. The equipment shown is
 3 representative of similar large construction projects, such as substations or wind farms
 4 and is not an exhaustive list. Equipment sound emissions were taken from either the
 5 Federal Highway Administration's (FHWA) Roadway Construction Noise Model
 6 (RCNM) or RSG measurements from previous studies. Sound levels for each piece of
 7 equipment are between 45 and 66 dBA at the nearest home. Actual sound levels are
 8 likely to be lower due to the soft ground and forest located throughout the Project area.

9 Major construction work, such as clearing for the access road and building site,
 10 will occur primarily from 7 am to 7 pm and thus not during nighttime hours when sleep
 11 disturbance could occur; however, some construction work, like extended concrete pours
 12 and interior work, may extend earlier or later.

Equipment	Maximum Sound Pressure Level at Reference Distance of 50 feet (dBA) ²	Maximum Sound Pressure Level at 1,150 feet (dBA) ³
M-250 Liftcrane	82.5	50
2250 S3 Liftcrane	78	45
Excavator	83	53
Dump truck being loaded	86	57
Dump truck at 25 mph accelerating	76	47
Tractor trailer at 25 mph accelerating	80	52
Concrete truck	81	48
Bulldozer	85	52
Rock drill	100	65
Loader	80	45
Backhoe	80	47
Chipper	96	66

² 50 feet is a reference distance at which sound levels of heavy equipment are often measured. It does not represent an actual distance between construction equipment and residences near the Converter Station.

³ Assumes hard ground around construction site, and ISO 9613-2 propagation with no vegetation reduction. Actual sound levels will likely be lower given the prevalence of vegetation and soft ground around the site.

1 **Q19. How do these sound levels compare with existing background levels and other**
2 **common activities?**

3 A19. Response: The loudest activities will be the preliminary activities of clearing the site,
4 drilling, and blasting. The land clearing will be temporary (about six weeks) and be
5 similar to other forestry activities in the area. Drilling and blasting is out of character
6 with the day to day noise sources in the area, but will also be temporary, likely extending
7 over a 12 week period. If blasting is required, blasts will be warned as per federal
8 requirements. Blasts will be designed by a licensed blasting company and charges and
9 delays will be set such that Bureau of Mines standards for vibration and air-blast will be
10 complied with. TDI-NE has submitted a separate Blasting Plan in the Section 248
11 Petition. Blasting will be limited to weekdays from 8 am to 5:00 pm, except in
12 emergencies. The remaining activities should average below 55 dBA during any daytime
13 period. This would be below the WHO "Serious Annoyance" guideline of 55 dBA
14 averaged over a 16-hour day.

15

16 **30 V.S.A. § 248(b)(5) and 10 V.S.A. § 6086(a)(8) – Aesthetics (Noise)**

17 **Q20. Based upon your analyses, will the NECPL create undue adverse impacts due to**
18 **noise either during construction or operation?**

19 A20. Response: The Project is not expected to create undue adverse impacts with respect to
20 noise during either construction or operation.

21

1 **Q21. Are any mitigating steps necessary to avoid any undue adverse impacts due to**
2 **Project-related noise?**

3 A21. Response: We have recommended and TDI-NE has incorporated into the design for the
4 Converter Station, low-noise cooling fans, noise barriers, and building walls sufficient to
5 control sound to meet the Project's noise goals. However, the specific vendor and
6 equipment will not be selected until the final design stage (after a CPG is granted). As a
7 result, the sound emissions of the Project based upon the final equipment selection may
8 be different than our current noise modeling results. If necessary, a different set of
9 mitigation measures would be selected at that time to ensure that the Project remains
10 within the noise limits.

11 **Q22. Does this conclude your testimony at this time?**

12 A22. Response: Yes.