



EXHIBIT B

THE STATE OF NEW HAMPSHIRE BEFORE THE NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

Docket No. DE 15-xxx

PETITION FOR APPROVAL OF LEASE AGREEMENT BETWEEN
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A EVERSOURCE ENERGY AND NORTHERN PASS TRANSMISSION LLC

PRE-FILED TESTIMONY OF ROBERT D. ANDREW

October 19, 2015

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9 PROPOSED LEASE OF UTILITY PROPERTY BETWEEN PUBLIC SERVICE COMPANY
10 OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY AND
11 NORTHERN PASS TRANSMISSION LLC
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13

14 **Q. Please state your name, business address and position.**

15 A. My name is Robert D. Andrew. I am employed by Eversource Energy Service Company as a
16 Director, System Planning. My business address is One NSTAR Way, Westwood, MA 02090.
17 Eversource Energy Service Company provides centralized services to the Eversource Energy
18 operating subsidiaries, including Public Service Company of New Hampshire d/b/a Eversource
19 Energy ("PSNH").
20

21 **Q. Have you previously testified before the New Hampshire Public Utilities Commission**
22 **("Commission")?**

23 A. No, I have not.
24

25 **Q. Please describe your education and qualifications?**

26 A. I hold a Bachelor of Science in Electrical Engineering Degree with Concentration in Electric
27 Power Systems from Northeastern University and also a Master of Science in Electrical
28 Engineering with Concentration in Electric Power Systems from Northeastern University.
29

30 I have worked in the electric power field for more than 35 years. Starting in 1979 as a
31 Distribution Engineer for PSNH, I then spent 12 years working in the generation area followed

1 by another ten years as a Transmission system operator and Manager of Transmission System
2 Operations in the Greater Boston area. Finally the last five years have been spent in the
3 System Planning area.

4
5 **Q. Please explain your duties and responsibilities as Director, System Planning at**
6 **Eversource.**

7 A. Among my primary responsibilities is ensuring that, as various projects interconnect to the
8 existing transmission system, the Eversource Energy transmission system will continue to
9 operate reliably and that transmission system reliability is maintained within specified criteria
10 prescribed by the Independent System Operator - New England ("ISO-NE") and consistent with
11 broader criteria prescribed by North American Electric Reliability Corporation ("NERC")
12 Reliability Standard TPL-001, which is available on the NERC website, www.nerc.com. These
13 transmission system reliability criteria are aimed primarily at maintaining bulk power system
14 voltages and assuring that transmission lines are not overloaded. Any entity proposing to
15 connect a project to the transmission system must follow ISO-NE Planning Procedures. The
16 types of projects that typically seek approval to connect to the transmission system vary, and
17 include: generator interconnections, distribution substations, elective transmission projects,
18 and transmission reliability projects.

19
20 **Q. What is the purpose of your testimony?**

21 A. The purpose of my testimony is to evaluate whether the proposed lease of certain PSNH
22 rights-of-way ("ROWS") to Northern Pass Transmission LLC ("NPT"), to be used for the NPT
23 transmission line ("NPT Line"), will affect PSNH's ability to maintain the reliability of the PSNH

1 transmission system or provide reliable service to its customers, and to describe my conclusion
2 that the construction of the NPT Line will not impair PSNH's ability to provide safe and reliable
3 service to its customers.

4
5 **Q. Please describe the ROWs that PSNH and NPT propose to include in the lease.**

6 A. The NPT line is a transmission line (and related facilities) consisting of a single circuit 320 kV
7 high voltage direct current ("HVDC") transmission line linked to a 345 kV alternating current
8 ("AC") transmission line via an HVDC/AC converter terminal located in Franklin, New
9 Hampshire. The NPT Line would begin at the Canadian border in Pittsburg, New Hampshire.
10 The NPT Line would then extend southerly on land or in ROWs belonging to entities other than
11 PSNH for approximately 40 miles (approximately 8 miles of this segment would be installed
12 underground in public roads). After reaching Dummer, the NPT Line would travel overhead in
13 ROWs owned by PSNH between Dummer and Bethlehem for a distance of approximately 40
14 miles (the "Northern Segment"). From Bethlehem, for a distance of approximately 52 miles
15 through the White Mountain region and to Bridgewater, the NPT Line would be located
16 primarily underground below public roads. Thereafter, the NPT Line would continue overhead
17 in PSNH's ROWs from Bridgewater approximately 25 miles to the converter terminal to be
18 constructed by NPT in Franklin, New Hampshire. The NPT Line would then continue in
19 PSNH's ROW as a 345 kV AC line from Franklin approximately 34 miles to an existing PSNH
20 substation in Deerfield, New Hampshire (together with the Bridgewater to Franklin corridor, the
21 "Southern Segment"). NPT would lease a portion of approximately 40 miles for the Northern
22 Segment and 60 miles for the Southern Segment, or a portion of approximately 100 miles of

1 PSNH's ROW. While the ROWs range in width along the corridor, they are at least 150 feet
2 wide throughout the areas to be leased for and used by the NPT Line.

3
4 **Q. Please describe how PSNH acquired and has used the ROWs for the Northern Segment.**

5 A. With respect to the Northern Segment, PSNH acquired the ROWs in question, for use as
6 transmission corridors, over a period of time, with sections dating back to the 1940's. The
7 primary reason for the acquisition was to expand PSNH's transmission system in order to
8 serve growing load in northern New Hampshire and to tie the system together with several
9 smaller utilities acquired by PSNH during the late 1930's and early 1940's.

10
11 For the section from Dummer to Whitefield, the NPT Line will utilize a transmission corridor
12 occupied by two existing 115 kV transmission lines, the O154 and D142 lines. These lines
13 were constructed primarily as a supply to the various mills located in Groveton and Berlin.
14 PSNH acquired the rights for the corridors during 1947 and began using them for electric
15 transmission by building transmission lines in that corridor around 1948. Since 1948, PSNH
16 has not constructed any new transmission lines, or made any significant modifications to the
17 existing lines, in this ROW. The lines have changed very little since the initial installation due
18 to the declining load in the area resulting from mill closures in northern New Hampshire.

19
20 For the section from Whitefield to the location in Bethlehem where the NPT Line transitions to
21 underground, the NPT Line will utilize a transmission corridor occupied by an existing 115 kV
22 transmission line, the X178 line. The X178 line was constructed as a supply to the various
23 mills located in northern New Hampshire and to connect with the hydro generation near the

1 Moore dam facilities. PSNH acquired the rights for this ROW during the late 1940's and built
2 the X178 line in that corridor in approximately 1948. Since 1948, PSNH has not installed any
3 additional transmission lines in this ROW. The lines have changed very little since the initial
4 installation, with the exception of a segment of the X178 line that was rebuilt in 1986 with a
5 larger conductor in order to facilitate the interconnection of the Hydro Québec DC line, Phase
6 1. The rebuild of the X178 line did not require the acquisition of additional ROW as it was
7 placed off center within the existing ROW, leaving space for future use of the ROW. The load
8 in this area has not required the upgrade of the remaining sections of the X178.

9
10 Typically, a 150 foot wide ROW can support numerous combinations of 34.5, 115 and 345 kV
11 lines. The number of lines within a ROW is dictated by the structure configuration, clearances
12 defined by the National Electrical Safety Code, and clearances required for the safe work
13 practices by the utility. Using PSNH standard structure designs, a 150 foot wide ROW could
14 accommodate either three 115 kV lines, or one 345 kV line and two 115 kV lines. Additional
15 line combinations could be obtained through alternative designs, such as compact structures
16 or double circuit structures.

17
18 **Q. Please describe how PSNH acquired and has used the ROWs for the Southern Segment.**

19 In the Southern Segment starting in Bridgewater and continuing to Franklin, the NPT Line will
20 utilize a transmission corridor occupied by two existing 115 kV transmission lines, the E115 and
21 A111 lines. These lines were constructed primarily to increase PSNH's ability to serve load in
22 northern New Hampshire and to upgrade the original 69 kV system supplying this area. PSNH
23 acquired the rights for these ROWs during the late 1940's and began using them for electric

1 transmission by building the E115 and A111 lines in that corridor between 1949 and 1953.

2 Since 1953, PSNH has not constructed any new transmission lines, and has only made minor
3 modifications to the existing lines in this ROW, which was combined with original ROW from
4 the 69 kV system. The lines have changed very little since the initial installation, and most of
5 the original installation remains. The load and added local generation in this area has not
6 required the upgrading of either line.

7
8 From Franklin until it terminates in Deerfield, the NPT Line will utilize a transmission corridor
9 occupied by three existing 115kV lines, the V182, P145 and G146 lines. These lines were
10 constructed primarily to support PSNH's ability to serve load in central and northern New
11 Hampshire, and as an upgrade to the original 69 kV system supplying this area. PSNH
12 acquired the 115 kV rights for these ROWs during the early 1950's and began using them for
13 electric transmission by building the P145, V182 and G146 lines in that corridor between 1950-
14 1953. Although PSNH has not constructed any new transmission lines in this ROW, which was
15 combined with original ROW from the 69 kV system, the existing three lines have changed
16 significantly since their initial installation, with very little of the original installation remaining.
17 The V182 and G146 lines were totally rebuilt prior to 2010, while sections of the P145 were
18 rebuilt and/or uprated after 2010. Prior to their rebuilding, the V182, G146, and sections of the
19 P145, lines were constructed with 795 ACSR conductor, which had a rating of approximately
20 236 MVA. The subsequent rebuilds utilized conductor sizes of 1272 and 1590 ACSR, more
21 than doubling the capacity of the original 795 ACSR. The improvements were required to
22 serve increased and future load in central New Hampshire and to ensure reliable transmission

1 service should other transmission be out of service. Potential future work in this area has also
2 been reviewed and would not be affected by the NPT Line.

3
4 **Q. Will the construction and presence of the NPT line affect PSNH's ability to provide safe
5 and reliable transmission service?**

6 A. Based on my review, adding the NPT Line to the PSNH ROW will not affect PSNH's ability
7 presently to provide safe and reliable transmission service. In some cases, however, in order
8 to maintain appropriate clearances for safety and reliability purposes certain PSNH lines will be
9 relocated within the ROW at NPT's expense to optimize the use of the ROW. Additionally,
10 some further clearing of the ROWs may occur, but such clearing would not extend beyond the
11 existing ROWs. Essentially, both the existing and relocated PSNH transmission facilities would
12 be used in the same manner and for the same purpose as their current use but the ROWs
13 would have additional transmission facilities.

14
15 **Q. Within the typical transmission planning horizon, will the NPT line affect PSNH's ability
16 to provide safe and reliable transmission service?**

17 A. No. Based on my review of the New Hampshire/Vermont Needs Assessment and Solutions
18 Assessment issued by ISO-NE, the NPT line will not affect PSNH's ability to provide safe and
19 reliable transmission service in the future for the following reasons.

20
21 First, the reports developed by ISO-NE, in conjunction with PSNH and other transmission
22 owners in New England, to identify system reliability upgrades over the ten (10) year planning
23 horizon have not identified any new transmission line that would need to use the PSNH ROWs

1 in which the NPT Line will be constructed. ISO-NE and PSNH regularly assess the
2 transmission reliability needs of the system. Those assessments are part of the regular
3 transmission review leading to the development and periodic updating of a Regional System
4 Plan (“RSP”) through ISO-NE. ISO-NE uses the RSP process to identify projects that are
5 necessary to maintain the reliability of the New England transmission system during a specified
6 planning horizon.¹

7
8 I have participated in the RSP and other planning processes and, based on my experience and
9 my understanding of the RSP, and other applicable planning studies developed to identify
10 solutions to the system needs in New Hampshire, ISO-NE and PSNH, the ISO-NE has not
11 identified any need that would require a new transmission line solution in any of the areas of
12 the PSNH ROW in which the NPT Line will be constructed. PSNH and ISO-NE have identified
13 a single reliability need affecting three 115kV transmission circuits (the E115, A111 and Z180
14 lines between Beebe River and Webster) within the PSNH ROW in which the NPT line will be
15 located, which requires rebuilding the circuits. The NPT line will have no impact on the rebuild
16 of these circuits. In fact, construction of the NPT line may provide an opportunity to construct
17 both projects at or near the same time, minimizing any impacts on the ROWs, the environment,
18 or customers.

19
20 Second, PSNH engages in its own planning studies similar to those employed by ISO-NE.
21 These studies are reflected in PSNH’s Local System Plan (“LSP”). The LSP evaluates the
22 service requirements of PSNH distribution substations and identifies the transmission solutions

¹A brief description of that process is contained in PSNH’s most recent Least Cost Integrated Resource Plan filing in Docket No. DE 15-248.

1 selected to address those requirements. Similar to the RSP, the LSP has not identified any
2 solutions that would require a new transmission line in any of the areas of the PSNH ROW in
3 which the NPT line will be constructed. Based upon my knowledge from participating in
4 developing the RSP and the LSP, there are no other areas of identified reliability need or
5 solutions that require use of any portions of the Northern or Southern Sections of the PSNH
6 ROW.

7
8 **Q. Beyond the planning horizon of approximately ten (10) years, will the NPT line affect**
9 **PSNH's ability to maintain safe and reliable transmission service with respect to the**
10 **term of the lease of the PSNH ROW?**

11 A. No. Based upon my experience and my understanding of other factors affecting decisions on
12 whether or not transmission system improvements are needed to maintain reliability, the
13 construction or existence of the NPT line in PSNH's ROWs will not have any detrimental
14 impact on PSNH's ability to provide reliable service for a number of reasons. First, the load
15 growth in the area of the Northern Segment has been flat and the lines have not required
16 upgrades. This is supported by information in PSNH's most recent Least Cost Integrated
17 Resource Plan submission, where it shows, for example, that load in the northern part of the
18 state is expected to be essentially flat after a period of decline over the last few years.

19
20 Second, the ISO-NE has identified growing energy efficiency, demand response programs, and
21 distributed generation programs, as developments that will result in flat or even decreasing
22 load, and that will diminish the need for new transmission infrastructure throughout New
23 England.

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Third, the load growth in the Southern Segment had required the lines be upgraded for the first time in over 60 years, which essentially doubled the capacity of those lines. Other New Hampshire lines have been identified for upgrades and included in the latest RSP, which do not affect the use of the ROW by NPT.

Fourth, in the areas where the NPT Line might require the relocation of existing PSNH transmission lines, the existing line would be replaced with conductor no smaller than 795 ACSR. For example, in the Northern Segment, the existing transmission lines from Whitefield to Dummer are constructed with 336 ACSR and NPT would replace these with 795 ACSR. The existing lines have a capacity of 140 MVA, once they are replaced the new capacity will be 286 MVA. The additional capacity provided by the NPT Line would reduce the possibility of capacity increase requirements in the future.

Fifth, even if a reliability need was identified in any of the ROWs occupied by the NPT Line in the distant future, the ISO-NE and PSNH would evaluate various transmission and non-transmission alternatives that do not require new transmission lines, such as re-conductoring existing lines, utilizing double circuit construction with distribution lines, or rebuilding of existing lines (which would double their capacity) or upgrades of substation terminal equipment to mitigate reliability criteria violations, all of which would be more cost effective than building a new line in these transmission corridors. Should events occur outside the normal planning process, such as new industry relocation, new generation, or similar significant event, use of the ROW by NPT will not adversely impact PSNH's ability to meet this need. Existing lines can

1 be re-conducted or rebuilt to increase the transmission line capacity into this area.

2 Rebuilding or re-conducting are considered typical approaches to the need for increased line
3 capacity.

4
5 The current ISO-NE process invites solutions from non-transmission projects, which is also a
6 trend across the utility industry. These alternatives would include solutions such as distributed
7 generation, energy efficiency or load adjustments to address the reliability need. The goal of
8 these alternatives is to moderate the need for large transmission infrastructure projects.

9 Finally, if a new transmission line of some type were needed for reliability, there are other
10 transmission corridors that can be used to address future reliability needs.

11
12 Given that: (1) there has not been a need for PSNH to use these portions of the ROWs for a
13 new transmission line for decades, since the last line was constructed in the 1950s; (2) there is
14 no current or foreseeable need to use these portions of the PSNH ROW for a new line; and (3)
15 there are transmission solutions available that would not include new transmission lines should
16 a need ultimately arise, it is my opinion that the construction of the NPT Line in PSNH's ROWs
17 will not diminish PSNH's ability to safely and reliably meet its customers' needs over the term
18 of the lease.

19
20 **Q. Does construction of the NPT Line in the ROWs provide any potential benefits?**

21 A. Yes, there are some potential benefits. As I noted earlier, within the transmission ROW
22 between Beebe River and Webster (Lines A111, E115, and Z180), PSNH already has an
23 identified need involving the rebuild of an existing transmission line, and instances where the

1 construction of the NPT Line can provide synergies that would allow both the NPT Line and
2 PSNH's project to be completed in a manner that reduces customer costs. As also stated
3 above, NPT may be required to relocate existing PSNH 115 kV lines, such as the O154 or
4 D142 in the northern segment, and is already planning to relocate and rebuild portions of these
5 lines with new structures and larger conductors. These rebuilds would increase the potential
6 capacity of the lines and address aging transmission structures at the same time, providing
7 benefits to New Hampshire electric customers. NPT would be responsible for the costs
8 associated with that work.

9
10 In addition, a transmission reliability need could arise in the areas between Franklin and
11 Deerfield. The 345-kV AC portion of the NPT Line connecting Franklin and Deerfield could
12 address that need by providing access to 345 kV to 115 kV transformation, which is a typical
13 system upgrade for relatively weak parts of the system. Such a need has been identified in the
14 past, and one of the alternatives considered in meeting that need was the construction of a 345
15 kV line that would run between the Deerfield, Webster and Coolidge (Vermont) substations.
16 Due to shifts in load, costs and changes to the transmission system, that need does not
17 currently exist, but should it reemerge, the NPT Line design will enable the solution.

18
19 **Q. Are there other benefits to the transmission system that result from construction of the**
20 **NPT line?**

21 **A.** There are numerous system benefits associated with the construction and operation of the
22 NPT line that have been identified by NPT in its Site Evaluation Committee filing. (See

1 Testimony of Bradley Bentley). I have reviewed those and concur with Mr. Bradley's
2 conclusions.

3

4 **Q. In your opinion, does the proposed use by NPT of the PSNH ROWs impair the use of the**
5 **ROWs to provide safe and reliable service to customers?**

6 A. No, the proposed use by NPT of the PSNH ROWs will not impair PSNH's ability to provide safe
7 and reliable service to customers. The ROWs have sufficient space to accommodate the NPT
8 Line without interfering with PSNH's ability to provide service. There are no identified safety or
9 reliability concerns with facilities in the ROWs and it is not expected that a new transmission
10 line will be needed for the foreseeable future. In the event that a transmission reliability need
11 were to arise in the decades to come in one of these areas, consistent with sound planning
12 principles and prudent utility practice, a broad spectrum of transmission and non-transmission
13 alternatives would be considered to address a potential future reliability need.

14

15 **Q. Does this conclude your testimony?**

16 A. Yes, it does.

17

18