

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**SUBSTITUTE PRE-FILED DIRECT AND AMENDED TESTIMONY OF  
KENNETH BOWES**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1

**Qualifications and Purpose of Testimony**

2

**Q. Please state your name, title, and business address.**

3

A. My name is Kenneth Bowes. I am a Vice President of Transmission Performance at Eversource Energy (“Eversource”), currently assigned to the Seacoast Reliability Project ( the “Project”) being developed by Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH”) . My business address is 107 Selden Street, Berlin, Connecticut, 06037.

8

**Q. Briefly summarize your educational background and work experience.**

9

A. I hold a Bachelor of Science degree in Electrical Engineering from the University of New Hampshire in Durham, New Hampshire and a Master’s of Science degree in Electrical Engineering from Rensselaer Polytechnic Institute in Hartford, Connecticut. I presently serve on the Edison Electric Institute (“EEI”) Transmission Committee and the EEI Security Committee. As a result of my work at Eversource, I have received awards from EEI for Emergency Recovery Award in 2013, Emergency Assistance Award in 2013, the Institute of Electrical and Electronic Engineers (“IEEE”), Power Engineering Society, Working Group Award in 1998. I have considerable engineering and operations experience in the many areas of transmission and distribution, including engineering, construction, maintenance and operations. I have overseen the entire project life-cycle for numerous transmission line and substation projects for Eversource and have served as a company officer and director in a variety of roles in support of our transmission and distribution systems.

23

I previously held the role of Director of Transmission Projects where I was responsible for the siting, permitting, engineering, design, construction, testing and commissioning of more than 500 transmission projects in New England totaling more than \$2 billion in investments. Specific projects included the: Long Island Replacement Cable, Glenbrook Cables Projects, Killingly Substation, Fitzwilliam Substation, 345-kV autotransformer additions at Haddam, Barbour Hill, Scobie Pond, Deerfield, Berkshire and Ludlow.

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Prior to this role, I was the Director of Transmission Construction, Test & Maintenance responsible for the field operations, construction and maintenance of the

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1 Eversource transmission system. Previous to this position I was the Director of  
2 Transmission & Distribution maintenance responsible for the field operations and  
3 maintenance of the Eversource transmission, substation and distribution systems  
4 including the transmission rights-of-way maintenance. Attachment A is my resume,  
5 which includes a list of other projects I have managed.

6 **Q. What is the purpose of this testimony?**

7 A. The purpose of my testimony is to adopt the pre-filed testimony of James  
8 Jiottis and to provide additional information to the SEC in support of PSNH's  
9 Amendment to the original Application dated April 12, 2016. Specifically, I explain that  
10 the Amendment does not change the conclusions from the pre-filed testimony of James  
11 Jiottis dated April 12, 2016.

12 **Q. Have you reviewed the amended Project Description submitted to the**  
13 **SEC?**

14 A. Yes, I have.

15 **Q. Does the amended Project Description change anything in your**  
16 **previously filed testimony?**

17 A. Yes. Approximately an additional half mile of the Project will be placed  
18 underground in the Town of Newington. Since the initial filing, PSNH has worked with  
19 the Town of Newington and property owners to address local concerns. As a result of  
20 ongoing discussions with the Town of Newington and its residents, and agreements  
21 reached with affected landowners, PSNH proposes to place additional segments of the  
22 Project underground in the areas of the Flynn Pit Town Forest, Frink Farm, Newington  
23 Center Historic District and the Hannah Lane residential neighborhood. PSNH has also  
24 made other design modifications, including, making adjustments to individual structure  
25 locations and the configuration of the Project at the request of landowners and abutters in  
26 both the Towns of Durham and Newington, and at the request of the NH DOT in the  
27 Town of Durham.

1

**Property Rights**

2

**Q. Please describe whether the Applicant has a current right, an option, or other legal basis to acquire the right, to construct, operate, and maintain the facility on, over, or under the site as described in the Application Amendment dated October 21, 2016.**

3

A. Since filing the initial Application, the Applicant has secured new contracts to acquire additional property rights to construct the Project underground in certain locations within the Town of Newington. For the Frink Farm, an amendment to the existing conservation easement has been executed and approved by the underlying property owners, the Town of Newington, the Rockingham County Conservation District, the New Hampshire Department of Justice and the United States Natural Resources Conservation Service, which will allow for the underground on that land.

4

**Routing Study and Alternatives Analysis**

5

**Q. Does the decision to go underground in two additional segments within the town of Newington, NH affect the Project's preferred route?**

6

A. The inclusion of the additional segments of underground through the Newington Center Historic District and along Little Bay Road does not change the preferred route or the cost effectiveness of the design.

7

**Overview of Project Design**

8

**Q. Please provide a general overview of the Amended Project design dated October 21, 2016?**

9

A. As anticipated in the original filing and after further consultation with the host communities, the Project has made significant modifications to the design of the Project, including the use of underground construction.

10

As originally proposed, the Project included approximately three-quarter miles underground, two segments in Durham and a segment in Newington. Based on continued discussions with the Town of Newington, PSNH was able to obtain additional contracts to acquire property rights to alter the underground location of the Project in and around Gundalow Landing, and the Flynn Pit. PSNH is also siting an additional half-mile of the Project underground across the Frink Farm, Newington Center Historic District and

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1 Hannah Lane residential neighborhood; the total amount underground construction for  
2 the Project will be approximately 1.25 miles.

3 **Q. Please describe the design of the underground segments included in**  
4 **the Amended Project design dated October 21, 2016?**

5 A. In general, the underground cable system will be similar to the design  
6 proposed in the initial application, using the same size and number of cables, placed in a  
7 similar underground facility in conduit encased in thermal sand and/or concrete. For  
8 additional information on the design of the underground segments please *see* Section  
9 301.03 (h)(1) of the Application.

10 Upon exiting the manhole on the eastern shore of Little Bay, the Project will now  
11 travel underground across private property where PSNH has contracted to acquire new  
12 easements adjacent to Gundalow Landing Road. Traveling east from Gundalow Landing  
13 the Project crosses Little Bay Road where it changes from the original proposal. The line  
14 now shifts to the north continuing underground across the Town of Newington's Flynn  
15 Pit property to an altered transition structure location on the Town property where PSNH  
16 has contracted with the Town to acquire new property rights. From the transition  
17 structure, the Project will travel overhead within the existing ROW corridor to the Frink  
18 Farm.

19 At the western property boundary of the Frink Farm the overhead design will  
20 transition to underground construction at another transition structure. The underground  
21 section will traverse the Frink Farm and Newington Center Historic District where burial  
22 depth will be increased from approximately 3.5 feet to 8 feet. The increased depth is  
23 required so as not to limit agricultural activity on the farm. The underground line will  
24 continue east under Nimble Hill Road and within the existing electric ROW corridor until  
25 it passes through the Hannah Lane residential neighborhood. The Project will then  
26 transition from underground back to overhead using another transition structure.

27 From the transition structure west of Hannah Lane, the Project will travel  
28 overhead within the existing ROW corridor to the Spaulding Turnpike and to the  
29 Portsmouth Substation, as originally proposed.

1                    **Optimization of Project Design and Collaboration with Host Communities**

2                    **Q.     With respect to the selected route modifications utilized in the**  
3 **Amended Project design dated October 21, 2016, how did PSNH optimize the design**  
4 **to minimize impacts?**

5                    A.     In Newington, the section of underground cable along Gundalow Landing  
6 Road to the crossing of Little Bay Road was originally to be placed within the road  
7 ROW. PSNH relocated the Project to the edge of the road ROW at the request of the  
8 Town of Newington. PSNH was then asked to move the design further off the road onto  
9 private property owned by residents along Gundalow Landing Road. PSNH successfully  
10 negotiated with the landowners on the northern side of Gundalow Landing Road to obtain  
11 the rights to acquire additional underground rights to facilitate a shift in the location of  
12 the cable.

13                    The Town of Newington also requested that the transition structure, for the  
14 underground cable leaving Gundalow Landing to transition to overhead in the ROW  
15 across Little Bay Road, be relocated off the existing ROW onto Town owned property  
16 known as the Flynn Pit. The relocation of the transition structures will limit their  
17 visibility and minimize impacts to an existing environmentally sensitive area. PSNH  
18 successfully negotiated with the Town of Newington to obtain a contract to acquire  
19 additional land rights to facilitate a shift in the location of the cable utilizing a swap of  
20 portions of the existing 100 foot wide electric ROW corridor for a new 50 foot wide  
21 electric ROW corridor across Town property.

22                    Also, in Newington, PSNH received and considered feedback regarding the  
23 design, which resulted in the removal of one structure.

24                    As part of continuing discussions with the Town and its residents regarding the  
25 underground design, PSNH presented options to the Town and abutters at public  
26 meetings and separate meetings with Town officials. PSNH met several times with the  
27 underlying landowners and worked closely with the residents in the Hannah Lane  
28 residential neighborhood to discuss the underground design. PSNH presented specific  
29 design options to the owners of the Frink Farm, Rockingham County Conservation  
30 District (holder of an agricultural conservation easement on the Frink Farm) and the  
31 Town of Newington to address certain concerns that were raised regarding the

1 agricultural uses of the Frink Farm. PSNH has successfully negotiated with the  
2 landowners of the Frink Farm and within the Hannah Lane neighborhood to acquire  
3 contracts to obtain underground rights. As anticipated in the original application, PSNH  
4 now proposes to construct the Project underground across the Farm, which in  
5 combination with the removal of the existing distribution line, will allow for the  
6 unobstructed use of the agricultural fields and return the Farm scenery to its 19<sup>th</sup> century  
7 landscape and viewscape. It should be noted, however, that it is not typically the practice  
8 of PSNH to construct either a distribution line or transmission line underground in areas  
9 where PSNH currently has overhead rights to construct and operate electric distribution  
10 or transmission facilities. In this case, PSNH remained committed to working with the  
11 Town of Newington to reduce concerns about potential impacts. Based on PSNH's  
12 continued outreach with the Town of Newington, it is the Company's position that the  
13 amendment addresses the concerns raised by the Town and reflects a more effective  
14 Project design as it traverses previously disturbed agricultural land and is a more direct  
15 underground route.

16 **Q. Please describe any additional benefits associated with constructing**  
17 **the Project underground across the Frink Farm.**

18 A. During the negotiations for underground rights across the Frink Farm,  
19 PSNH collaborated with the Rockingham County Conservation District ("RCCD") and  
20 the Frink family to identify work methods and fund improvements to the Frink Farm.  
21 The work methods include specific soil handling practices to minimize disturbance to  
22 farm soils. PSNH has also committed to retaining a mutually agreed-upon outside expert  
23 to monitor the construction work across the Frink Farm and to ensure the protection of  
24 the soils.

25 PSNH has also agreed to fund improvements to the Frink Farm and enhance its  
26 future viability as a working farm. These improvements include, but are not limited to,  
27 the seeding of agricultural fields, improvement of fields and replacement of fencing.  
28 Improvements to the farm will be managed and monitored by the RCCD. PSNH has  
29 agreed to compensate the Frink Farm for lost crops during the construction process.

1           The underground rights negotiated with the Frink family also reduce the amount  
2 of area encumbered by the easement, which reduces future impact on the agricultural uses  
3 of the farm.

4           **Q.     Has the Project made any design modifications to the overhead**  
5 **portion of the Project?**

6           A.     Yes. PSNH has made changes to the overhead line design as a result of  
7 discussions and meetings with abutters and other stakeholders in the Towns of Durham  
8 and Newington. First, PSNH has made minor changes to the overhead design to  
9 accommodate comments made by the NHDOT in their progress report submitted to the  
10 SEC on November 21, 2016. These changes include minor structure shifts and  
11 configuration changes. Specifically, near Madbury Road and Route 4 in Durham, PSNH  
12 moved the alignment approximately ten feet west, within the originally proposed  
13 corridor, to increase spacing to the existing bridge abutments at those crossings. At the  
14 Madbury Road crossing, two H-frame structures were modified to be single pole  
15 structures. These changes allow additional clearance to the bridges and abutments to  
16 allow for maintenance and construction.

17           Second, PSNH moved the location where the overhead line transitions from a  
18 double circuit structure to a side-by-side configuration, where the 115kV line and 34.5kV  
19 line are on separate structures, near Durham Point Road. The transition occurs at  
20 Structure 91 instead of Structure 93 as originally proposed. The alteration allows for  
21 longer span lengths and the elimination of proposed Structure 92. Third, near Fox Point  
22 Road in Newington, PSNH redesigned the section between Structures 116 and 118 to  
23 eliminate Structure 117 located in the middle of the open field. Fourth, at Route 108,  
24 PSNH modified the design of the 34.5kV line to reduce wetland impacts and conform to  
25 newly completed distribution line and road construction at the transmission line crossing.  
26 Fifth, PSNH relocated two structures near Gosling Road in Newington to accommodate a  
27 new road easement for the Shattuck Way extension. Finally, PSNH reviewed the  
28 required structure height for the underwater to overhead transition riser at Structure 101  
29 to reduce it from approximately 80 feet above ground to approximately 70 feet above  
30 ground.





**ATTACHMENT A.**  
**RESUME OF KENNETH BOWES**

## **BIOGRAPHICAL INFORMATION**

### **Kenneth B. Bowes**

Kenneth B. Bowes is Vice President – Transmission Performance responsible for the leadership and direction of Transmission performance as it relates to short and long term customer impacts and benefits, development of key siting witnesses, Transmission performance indicators, FERC and state regulatory plans, and operational compliance. He serves as a technical consultant and expert witness for various regulatory proceedings and large transmission projects.

A native of New Hampshire, Bowes joined Eversource in July 1984 in the System Test department. He has held several engineering and management positions in the Energy Delivery organizations becoming the Director – Transmission and Distribution Maintenance in 1999, Director – Transmission Construction, Test, and Maintenance in 2002, Director – Transmission Projects in 2004, Vice President – Customer Operations in 2008, and Vice President of Energy Delivery in 2010, Vice President of Engineering in 2014.

Bowes earned a Bachelor of Electrical Engineering degree from the University of New Hampshire and a Master's Degree in Electrical Engineering from Rensselaer Polytechnic Institute. Bowes is the past Chairman of the Edison Electric Institute's Transmission Committee and presently serves on the EEI Transmission and EEI Security Committees.

## **PUBLICATIONS AND PREVIOUS TESTIMONY**

### **Kenneth B. Bowes**

#### Publications:

- Bowes K., Beehler M., "Defining the Value of the Grid", IEEE, The Sixth Annual IEEE PES Conference on Innovative Smart Grid Technology, February, 2015
- Bowes K., Hogan J., "CL&P Explores Sustainable Solutions", Transmission & Distribution World Magazine, January 2012, Volume 64, Number 1, pp. 24-31.
- IEEE Working Group on Nonsinusoidal Situations, "Practical Definitions for Powers in Systems with Nonsinusoidal Waveforms and Unbalanced Loads: A Discussion", 95 WM 040-6 PWRD, 1995
- IEEE Working Group on Nonsinusoidal Situations, "A Survey of North American Electric Utility Concerns Regarding Nonsinusoidal Waveforms", 95 WM 036-4 PWRD, 1995
- Bowes, K. B., "The Effects of Temporary Overvoltage (TOV) on Consumer Products", POWER QUALITY '91 USA, Official Proceedings of the Third International Power Quality Conference, Universal City, CA, September 22-27, 1991
- Bowes, K. B., Lorusso, A., "Harmonic and Power Characteristics of Electronic Ballasts for Fluorescent Lighting Applications", POWER QUALITY '90 USA, Official Proceedings of the Second International Power Quality ASD Conference, Philadelphia, PA, October 21, 29, 1990
- Anderson, L.M., Bowes, K.B., "The Effects of Power-line Disturbances on Consumer Electronic Equipment", IEEE Transactions on Power Delivery, Volume 5, Number 2, pp. 1062-65, April 1990
- Bowes, K. B., "The Effects of Power-line Disturbances on Electronic Products", POWER QUALITY '89 USA, Official Proceedings of the First International Power Quality Conference, Long Beach, CA, October 15-20-1989 (Also edited and reprinted in Power Quality Magazine - Premier V Issue)

Mr. Bowes has testified extensively in many cases in a variety of forums, including;

- Connecticut Siting Council Docket No. 461 – Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.
- Connecticut Siting Council Docket No. 292 – The Connecticut Light & Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction and operation of 8.7 miles of new underground 115-kilovolt electric transmission cables extending from CL&P's existing Glenbrook Substation in the City of

Stamford, through the Town of Darien, to CL&P's existing Norwalk Substation in the City of Norwalk;

- Connecticut Siting Council Docket No. 302 – Northeast Utilities Service Company, on behalf of The Connecticut Light and Power Company (CL&P) application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of the proposed Killingly 2G Substation at 193 Tracy Road and 227-257 Park Road in the Towns of Killingly and Putnam, and the proposed connections to the existing #347 345-kV line and the existing #1607 and #1505 115-kV lines;
- Connecticut Siting Council Docket No. 311 – Northeast Utilities Service Company, on behalf of The Connecticut Light and Power Company (CL&P) Application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of the proposed Wilton 35A Substation at 53 Old Danbury Road in the Town of Wilton;
- Connecticut Siting Council Docket No. 326 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located at Stepstone Hill Road, Guilford, Connecticut; and
- Connecticut Siting Council Docket No. 327 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located off Commerce Drive, Oxford, Connecticut.
- Connecticut Siting Council Docket No. 352 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located at 264 Rood Avenue and 25 Shelley Avenue, Windsor, Connecticut;
- Connecticut Siting Council Docket No. 461 - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.
- State of New Hampshire, Before the Site Evaluation Committee, Docket No. 2015-06, Joint Application of Northern Pass Transmission LLC and Public Service Company of New Hampshire d/b/a Eversource Energy For A Certificate of Site and Facility To Construct A New High Voltage Transmission Line And Related Facilities In New Hampshire.
- Commonwealth of Massachusetts, Energy Facilities Siting Board, EFSB 07-4/D.P.U. 07-35/07-36, Petition of Russell Biomass, LLC. and Western Massachusetts Electric Company for a proposed project consisting of (1) an approximately 5.3-mile, 115 kilovolt transmission line from the proposed Russell Biomass generating facility in Russell to Western Massachusetts Electric Company's ("WMECo") transmission system in Westfield, and (2) a new switching station facility in Westfield.

- Connecticut Superior Court, Allyn vs. CL&P, CV-96-0109273-S;
- Connecticut Superior Court, Scanlon vs. CL&P, CV-96-0536911S;
- Connecticut Superior Court, Segalla vs. CL&P, X-04-CV-98-0117225S;
- DSV MR. SONNY: Damage to submarine electric cables in Long Island Sound. Complex, multi-party limitation of liability proceeding in U.S. District Court for the Eastern District of New York. Settled at mediation;
- Connecticut DPUC Docket No. 94-05-35 - DPUC Investigation Into Stray Voltage On Dairy Farms;
- Connecticut DPUC Docket No. 08-02-06, DPUC Investigation into The Connecticut Light and Power Company's Billing Issues;
- Connecticut DPUC Docket No. 09-12-05 - Application of The Connecticut Light and Power Company to Amend Its Rate Schedules;
- Connecticut DPUC Docket No. 10-03-08 – Investigation of the Service Response and Communications of The Connecticut Light and Power Company (CL&P) and The United Illuminating Company (UI) Following the Outages from the Severe Weather over the Period of March 12 through March 14, 2010;
- Connecticut DPUC Docket No. 10-05-09 - DPUC Investigation of the Safety of the Connecticut Light and Power Company Underground Electric Distribution System in Waterbury;
- Connecticut PURA Docket No. 11-03-07, PURA Investigation Into The Appointment Of A Third Party Statewide Utility Telephone Pole Administrator For The State Of Connecticut; and,
- Connecticut PURA Docket No. 11-09-09 - PURA Investigation of Public Service Companies' Response to 2011 Storms;
- Connecticut PURA Docket No. 12-01-07 – Application for Approval of Holding Company Transaction Involving Northeast Utilities and NSTAR;
- Connecticut PURA Docket No. 12-01-10 - Investigation into the Tree Trimming Practices of CT Utility Companies;
- Connecticut PURA Docket No. 12-06-09 - PURA Establishment of Industry Performance Standards for Electric and Gas Companies;
- Connecticut PURA Docket No. 12-07-06RE01 – Application of the Connecticut Light and Power Company For Approval of its System Resiliency Plan – Expanded Plan;
- Connecticut PURA Docket No. 12-06-12 – PURA Investigation of the Feasibility of the Establishment of a Program to Reimburse Residential Customers for Spoilage Loss of Food items or Refrigerated Medications Caused by a Lack of Refrigeration During Electric Service Outages;
- Connecticut PURA Docket No. 12-09-13 – PURA Investigation of the Best Practices of Other State Public Utility Commissions, Public Utility Companies and Municipal Utilities' Emergency Management Best Practices;
- Connecticut PURA Docket No. 12-11-07, PURA Investigation into the Performance of Connecticut's Electric Distribution Companies and Gas Companies in Restoring Service Following Storm Sandy;

- Connecticut PURA Docket No. 13-03-23, Petition of the Connecticut Light and Power Company for Approval to Recover its 2011-2012 Major Storm Costs;
- Connecticut PURA Docket No. 14-05-06 – Application of the Connecticut Light and Power Company To Amend Rate Schedules;
- Connecticut PURA Docket No. 14-07-18 – PURA Report to the General Assembly Concerning its Review of Each Electric Distribution Company’s Vegetation Management Practices;
- Connecticut PURA Docket No. 15-01-27 - Attorney General and Office of Consumer Counsel Request for Investigation of Northeast Utilities Facilities Closures in Connecticut
- Connecticut PURA Docket No. 15-12-20 – PURA Review of Electric Companies’ and Electric Distribution Companies’ Plans for Maintenance of Transmission and Distribution Overhead and Underground Lines
- Public Act 15-5 - Section 103 - Grid-Side System Enhancements Demonstration Projects