

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

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE FOR A LICENSE TO CONSTRUCT AND MAINTAIN ELECTRIC LINES, STATIC WIRE AND FIBER OPTIC CABLE OVER AND ACROSS THE PUBLIC WATERS OF OYSTER RIVER IN THE TOWN OF BARRINGTON, DUBE BROOK AND OYSTER RIVER IN THE TOWN OF LEE, AND BEAN RIVER, NORTH RIVER AND LITTLE RIVER IN THE TOWN NOTTINGHAM, NEW HAMPSHIRE.

TO THE PUBLIC UTILITIES COMMISSION:

Public Service Company of New Hampshire (“PSNH”), a public utility engaged in the generation, transmission, distribution and sale of electricity in the State of New Hampshire, hereby petitions the Public Utilities Commission (“Commission”), pursuant to RSA 371:17, for a license to construct and maintain electric lines, static wire and fiber optic cable at six locations over and across public waters in the Towns of Barrington, Lee and Nottingham, New Hampshire, and in support of its Petition states as follows:

1. In order to meet the reasonable requirements of service to the public, PSNH has previously constructed and currently operates and maintains a 115 kV transmission line, designated as line L-175. The L-175 line runs between PSNH’s Deerfield Substation in Deerfield, New Hampshire, and PSNH’s Madbury Substation, in Madbury, New Hampshire, and is an integral part of the PSNH transmission system and the overall New England transmission grid. The L-175 line, as presently constructed, crosses public water bodies at six locations. One crossing is over the Oyster River in the Town of Barrington. There are two crossings in the Town of Lee, New Hampshire; one over Dube Brook and the other over the Oyster River. The last three crossings are in the Town of Nottingham, New Hampshire over the Bean River, North River and Little River. None of the six existing overhead crossings of the L-175 line have been previously licensed by the Commission.¹

2. In order to continue to meet the reasonable requirements of service to the public, PSNH has determined it is necessary to upgrade the L-175 line conductors to increase the power transfer capability of the line. This need is a result of load growth in the seacoast area of New Hampshire and an additional autotransformer being installed at Deerfield Substation in Deerfield, New Hampshire. The in-service date for this transformer will be no later than December 2012. To support this date, the L-175 line will need to be in-service by December 2010, with a proposed construction start date for

¹ The L-175 line crossings of the Bean River, North River, Little River, Oyster River and Dube Brook were apparently not previously licensed due to either oversight or to the application of navigability or other crossing license criteria at the time of original construction. The rebuild of the L-175 crossing of these public waters at these locations will be licensed under this Petition.

rebuild of the L-175 line in approximately February 2010 to meet this requirement. A 4.57 mile length of the L-175 line between Deerfield and Madbury Substations (Structures 91-133) is constructed with vertically bundled 266 ACSR, two conductors per bundle. The remainder of this line, from Madbury Substation to Structure 91 and from Structure 133 to Deerfield Substation, is 795 ACSR. This project will remove all of the 266 ACSR and 795 ACSR and replace it with 1590 ACSR for the entire 12.89 mile length of the line between Deerfield and Madbury Substations. Replacing this transmission line will remove an overload condition that will occur when the new transformer at Deerfield Substation is placed in service. Upgrading this portion of the L-175 line will allow PSNH to continue to provide reliable electric service to its customers in this area of the State.

3. The necessary conductor upgrade of the L-175 line will require that the line and its associated water crossings be rebuilt within the right-of-way corridor that it presently occupies. The existing L-175 structures, most of which are a mix of single pole and H-frame type construction, will be replaced with new structures designed to handle the increased loads of the larger conductor. The design of these structures will be based on NESC Grade B construction requirements. The existing 266 ACSR 6/7 and 795 ACSR 36/1 phase wires will be replaced with 1590 ACSR 45/7. A majority of the line will be rebuilt utilizing single pole structures with davit arms. In these locations, the two existing static wires will be replaced with only one new optical ground wire, containing a 24 fiber optic cable, known as OPGW cable. Use of OPGW cable instead of regular static wire will also improve and enhance the reliability and capacity of the communications systems used in PSNH's electric system operations. Where the existing H-Frame type structures are being replaced with new H-Frame type structures or deadend structures, one 19#10 Alumoweld static wire and one OPGW cable will be installed.

4. Rebuilding the L-175 line will require construction of six new overhead crossings at the following public water body locations: two locations on the Oyster River with one located in the Town of Barrington, and one in the Town of Lee, one location on the Bean River in the Town of Nottingham, one location on the North River in the Town of Nottingham, one location on the Little River in the Town of Nottingham, and one location on Dube Brook in the Town of Lee. The location map, design and proposed construction plan and profile drawing, and required clearance calculations for each of the new crossings are attached to this Petition as Appendices A through F inclusive. A table of crossings to be licensed has been attached as Table 1 of this Petition.

5. The required technical information provided in this Petition is based on the 2007 National Electrical Safety Code (NESC) C2-2007.

6. All public water bodies will be spanned using laminated wood structures. These structures will all be either single pole tangent structures (Type WT-1) or two pole H-frame tangent structures (Type RAX), depending on the design criteria for each crossing. A detail design specification for each of these structure types is attached to this Petition as FIGURE 1 and FIGURE 2 respectively. As shown on FIGURE 1, the top and middle phase wires have an approximate separation at the structure of 7-ft vertically and

12-ft horizontally, while the middle and bottom phase wires are 8-ft vertically and 13-ft horizontally. The static wire (OPGW) is carried on the structure by a support bracket approximately 6" down from the top of the structure. As shown on FIGURE 2, the phase wires are arranged in a horizontal configuration and have an approximate separation at the structure of 14-ft horizontally. The static wire and OPGW are carried on the structure by support brackets approximately 9" down from the top of the structure, with one on each pole.

7. Flood water elevations for the crossings were based on information contained in flood insurance rate maps obtained from FEMA. Table 232-1, note 18 of the NESC states that the minimum clearance over a water body must be based on a 10-yr flood elevation. For the purpose of the design of the crossings covered by this Petition, the 100-yr flood elevation was used. It should be noted that the 100-year elevations would be well above the 10-year flood elevation.

8. Based on Table 232-1.7 of the NESC, for open supply conductors 750 V to 22 kV to ground, the minimum clearance to the water surface during normal flood level (100-yr flood for the purpose of this Petition) for water bodies suitable for sail boating is 20.5' (for waters less than 20 acres), and 28.5' (for waters 20-200 acres). NESC Rule 232.C.1.a states that an additional clearance of 1.6-ft or $[(69.7 \text{ kV} - 22 \text{ kV}) \times 0.4]$ is needed for 115 kV, which brings the total required minimum clearance to 22.1' and 30.1' respectively. For overhead shield/surge protection wires that meet NESC Rule 230.E.1, the minimum clearance to the water surface at the normal flood level is 17.5' and 25.5' respectively for those water bodies. As the static wires are located above the phase wires at all crossings, this NESC minimum clearance requirement will always be met. Based on Table 232-1.2 of the NESC, for open supply conductors 750 V to 22 kV to ground, the minimum clearance to roads subject to truck traffic is 18.5'. With the additional 1.6' of clearance required for 115 kV, the total required clearance is 20.1'. Based on Table 232-1.6 of the NESC, for open supply conductors 750 V to 22kV to ground, the minimum clearance to water areas not suitable for sail boating is 17.0'. With the additional 1.6' of clearance required for 115kV, the total required clearance is 18.6'

9. Of the six crossing locations detailed above, five of them will have a total of three phase wires and one OPGW cable spanning each water body. At the sixth, the Dube Brook crossing (Appendix E), a total of three phase wires, one OPGW cable and one 19#10 Alumoweld static wire will span the water crossing. All three 1590 ACSR 45/7 phase conductors, the OPGW cable and static wire will be sagged using the NESC Heavy Loading (0 degrees F., 4 pounds per square foot wind loading, ½-inch radial ice) sag charts upon installation in the field. The 1590 ACSR conductors will be sagged using a maximum tension of 10,000 pounds at NESC Heavy Load conditions. The OPGW cable and 19#10 Alumoweld static wire will be sagged using a maximum tension of 4,500 pounds at NESC Heavy Load conditions. The sags and clearances to the water surface for each of the proposed crossings are provided in the attached Appendices.

10. Four of the twelve new crossing structures (Appendices B and C) will be set within jurisdictional wetlands or other areas that require New Hampshire Department

of Environmental Services (NHDES) permitting. The appropriate NHDES wetlands permits have been applied for and will be obtained by PSNH prior to the installation of any new structures associated with these crossings including their required construction access.

11. The proposed crossings have been designed and will be constructed, maintained and operated by PSNH in accordance with the applicable requirements of the NESC.

12. PSNH owns permanent easements, not less than 295' wide, for its lines and facilities on both sides of the public water bodies at all of the proposed crossing locations. Each of the crossings will be constructed within the limits of those easements.

13. PSNH submits that the license petitioned for herein may be exercised without substantially affecting the rights of the public in the public waters listed in this Petition. Minimum safe line clearances above all water surfaces and affected shorelines will be maintained at all times. The use and enjoyment by the public will not be diminished in any material respect as a result of the overhead line and cable crossings.

WHEREFORE, PSNH respectfully requests that the Commission:

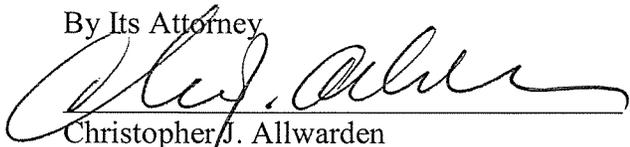
- a. Find that the license petitioned for herein may be exercised without substantially affecting the public rights in the public waters which are the subject of this Petition;
- b. Grant PSNH a license to construct and maintain electric lines, static wire and fiber optic cable over and across the public waters as specified in the Petition; and
- c. Issue an Order Nisi and orders for its publication.

Dated at Manchester this 23rd day of December, 2009.

Respectfully submitted,

PUBLIC SERVICE COMPANY OF NEW
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By Its Attorney



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