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 WIRES AND FIBER OPTIC CABLE OVER AND ACROSS THE MERRIMACK RIVER IN THE TOWNS OF MERRIMACK AND LITCHFIELD, 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 wires and fiber optic cable at two locations over and across the public waters of the Merrimack River in the Towns of Merrimack and Litchfield, 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 K165. The K165 line runs in a generally north-south direction between PSNH's Reeds Ferry Substation in Merrimack, New Hampshire, and Power Street Substation, in Hudson, New Hampshire, and is an integral part of the PSNH transmission system. An existing 115kv tap off of the K165 line runs in a generally east-west direction from the tap point in Litchfield, New Hampshire, to PSNH's Anheuser-Busch Substation in Merrimack, New Hampshire, this segment of the K165 line also being known as the "Busch Tap".

2. The K165 line "Busch Tap", as presently constructed, crosses over the public waters of the Merrimack River in the Towns of Litchfield and Merrimack. The existing overhead crossing of the K165 line "Busch Tap", which consists of three phase conductors, two static wires and one under built all-dielectric self supporting fiber optic cable (ADSS), was previously licensed by the Commission in Docket D-E5747, Order No. 9,829 dated November 28, 1969 (licensing the phase and static wires), and in Docket DE 97-117, Order No. 22,660, dated July 14, 1997 (licensing the ADSS installation).

3. In order to continue to meet the reasonable requirements of service to the public, PSNH has determined that it is necessary to reconfigure the K165 line by splitting the current K165 line at a point in Litchfield into two separate 115kV transmission lines. This will result in the removal of the existing K165 line "Busch Tap" and its crossing, to be replaced by two separate 115kv lines, each of which will cross over the Merrimack

River in the same general location as the existing crossing.[1] The two separate lines are needed to interconnect into a new PSNH 115 kV transmission switchyard (designated the Eagle Substation), now under construction on PSNH-owned property in Merrimack on the west side of the Merrimack River. The Eagle Substation is needed to power a new PSNH distribution substation (designated the Thornton Substation), which is also under construction on PSNH's property in Merrimack in the same vicinity as the Eagle Substation, and which is being built to increase electric system infrastructure reliability in the area.

4. The project will involve two 115kV line segments being constructed over the Merrimack River. One of these, which will continue to be designated the K165 line, will be constructed in a location approximately 50 feet southerly of the existing K165 line "Busch Tap" crossing (which is being removed and replaced). This will allow space for the construction of the other new 115kV line segment, to be designated the H123 line, to be constructed to the north of the K165 line crossing. After crossing the River from the Litchfield side, both the K165 and H123 lines will interconnect into the new Eagle Substation on the Merrimack side. The new sections of the K165 and H123 Lines are to be constructed with 1590 ACSR 45/7 conductor, and 19#10 Alumoweld static wire. The K165 Line will also have an optical ground wire (OPGW) cable in one of the static wire positions to replace the existing ADSS cable.

5. As part of this project, the existing structures of the K165 line "Busch Tap" crossing, which are wood H-frame type construction, will be removed and replaced. The design of the new structures to be used in the construction of the new 115kv line segments has been based on NESC Grade B construction requirements and will be capable of handling the required loading. These new line crossings will be built using direct embed laminated wood pole structures and steel poles on concrete foundations.

6. The general location of the H123 and K165 lines that will cross the Merrimack River are shown on the U.S. Geologic Survey location plans attached and marked as Exhibit 1 to Appendices A and B of this petition, respectively.

7. The design and proposed construction of the H123 line crossing is shown on the attached Northeast Utilities Transmission Business plan and profile drawing entitled "H123 LINE (115 kV) CROSSING BETWEEN STR. #201 & #202 MERRIMACK RIVER CROSSING, MERRIMACK AND LITCHFIELD, NEW HAMPSHIRE", attached and marked as Exhibit 2 to Appendix A of this petition. Appendix A includes the required clearance calculations for the new H123 line crossing.

8. The design and proposed construction of the K165 line crossing is shown on the attached Northeast Utilities Transmission Business plan and profile drawing entitled "K165 LINE (115 kV) CROSSING BETWEEN STR. #183 & #184

[1] The Anheuser-Busch Substation, formally fed by the K165 line "Busch Tap", will now be fed by a new, separate line out of the Eagle Substation which will not involve any river crossing.

MERRIMACK RIVER CROSSING, MERRIMACK AND LITCHFIELD, NEW HAMPSHIRE", attached and marked as Exhibit 2 to Appendix B of this petition. Appendix B includes the required clearance calculations for the new K165 line crossing.

9. The required technical information provided in this petition is based on the 2007 National Electrical Safety Code (NESC) C2-2007, which meets or exceeds requirements of the NESC C2-2002 required by the New Hampshire Code of Administrative Rules (Puc 306.01.b.1).

10. The Merrimack River crossing will be spanned by the H123 line using one new direct embed laminated wood structure and one new steel structure on a concrete foundation (Structures 201 and 202). Both structures will have the same configuration and will be two pole H-frame tangent structures (Type RAX). A detail design specification for these structures is attached to this petition as FIGURE 1. As shown in FIGURE 1, the phase wires are arranged in a horizontal configuration and have an approximate separation at the structure of 14' horizontally. The static wires are carried on the structure by support brackets approximately 9" below the top of the structure, with one on each pole. The Merrimack River will also be spanned by the K165 line crossing, but will utilize one new direct embed laminated wood structure (structure 184) and one steel pole on a concrete foundation (structure 183). The laminated wood structure will be a two pole H-frame tangent structure, the same as utilized on the H123 line mentioned above. The other structure will be a custom single pole steel structure mounted on a foundation. A detail design specification for the steel pole is attached to this petition as FIGURE 2. As shown in FIGURE 2, the phase wires are arranged in a vertical configuration and have an approximate separation along the structure of 10'. The static wire is carried on the structure by a support bracket approximately 9" below the top of the structure, and the OPGW will be carried on a support bracket approximately 1'- 9" below the top of the structure.

11. Flood water elevations for the crossings are calculated based on information found on Department of Housing and Urban Development Federal Insurance Administration's Flood Profiles for the Merrimack River in the Town of Litchfield, NH. These elevations were confirmed with information found on FEMA flood Map #33011C0503D Panel 503 of 701 and Flood Insurance Study #33017CV001A. Clearance is required to the 10-yr flood elevation in accordance to note 18 Section 232 of the NESC. Clearances will be above this level. All elevations are based on NAVD 88 datum.

12. 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 for water bodies suitable for sail boating is 28.5' (for waters 20-200 acres). NESC Rule 232.C.1.a states that the minimum clearance increases by 0.4 inches for every kilovolt in excess of 22 kV. It also specifies that at voltages above 50 kV the minimum clearance is based on the maximum operating voltage of the line. Voltage is required to be within 5 percent of the nominal voltage for all operating conditions. Therefore the maximum phase to phase operating voltage is 120.8kV for clearance calculations (115

kV x 1.05). Based on this rule, an additional clearance of 1.6' or [*69.7 kV* - 22 kV) x 0.4] is needed for 115 kV, which brings the total required minimum clearance to 30.1'. For overhead shield/surge protection wires and OPGW cables that meet NESC Rule 230.E.1, the minimum clearance to the water surface at the normal flood level is 25.5'. As the static wires and fiber optic cable are located above the phase wires at all crossings, this NESC minimum clearance requirement will always be met. Minimum distance to the road for truck traffic, based on Table 232-1.2 of the NESC for open supply conductors for 750V to 22kV to ground, is 18.5'. With the additional 1.6' of clearance required for 115 kV, the total required clearance is 20.1'.

13. At each of the two new line crossing locations detailed above there will be three phase wires spanning the water body. At the location of the K165 line crossing, one static wire and one OPGW cable will span the river. At the location of the H123 line crossing, two static wires will span the water body. All six 1590 ACSR 45/7 phase conductors, the OPGW cable and 19 #10 alumoweld 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 original 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 4,200 pounds and 4,500 pounds respectively at NESC Heavy Load conditions. The tensions and clearances of each wire and cable will be confirmed by survey at the time of installation. The sag and clearance to the water surface for each of the proposed crossings is provided in the attached Appendix A (H123) and Appendix B (K165).

14. Replacement of existing structures and the placement of two new structures will occur within the protected shoreland of the Merrimack River as defined by RSA 483-B. While RSA 483-B:5-b(1)a requires a shoreland permit for construction, excavation or filling activities within the protected shoreland, Administrative Rule Env-Wq 1406.04(d)(7) exempts from these permitting requirements the replacement of utility poles and guy wires using mechanized equipment, provided that appropriate siltation and erosion controls are used and all temporary impacts are restored. PSNH will comply with this Administrative Rule in the installation of replacement structures. The new structures that will be installed in the protected shoreland are currently permitted by New Hampshire Department of Environmental Services (NHDES) Shoreland Impact Permit #2011-00451

15. As the Merrimack River is a federally-designated navigable water, PSNH has previously consulted with the U.S. Army Corps of Engineers (USACE) and has been advised that, when wire and cable clearances will be increased over those presently in place, no Army Corps permit modifications are required. The replacement of the existing K165 line Tap will entail raising the line within the existing corridor so a permit modification will not be required. As the H123 is a new line, a permit modification will be required. PSNH is currently working with the USACE to obtain this permit modification.

16. The proposed crossings will be maintained and operated by PSNH in accordance with the applicable requirements of the NESC.

17. PSNH owns permanent easements 320' wide for its lines and facilities on the east side of the Merrimack River, and owns the land in fee on the west side of the Merrimack River, at the location of the proposed crossings. The crossings will be raised within the limits of those easements and the PSNH-owned land.

18. PSNH submits that the license petitioned for herein may be exercised without substantially affecting the rights of the public in the public waters of the Merrimack River. 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 wires 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 30th day of NOVEMBER 2011.

Respectfully submitted,

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