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

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE FOR LICENSE TO CONSTRUCT AND MAINTAIN ELECTRIC LINES OVER AND ACROSS THE PEMIGEWASSET RIVER IN THE TOWNS OF NEW HAMPTON AND BRISTOL, 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 over and across the public waters of the Pemigewasset River in the Towns of New Hampton and Bristol, 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 three-phase 34.5 kV distribution line, designated as the 3114X circuit, in New Hampton and Bristol, New Hampshire, which is an integral part of PSNH's electric distribution system in the New Hampton and Bristol area. Without this facility, reliable electric service cannot be maintained in these areas. This line currently crosses over the Pemigewasset River adjacent to Central Street (Bristol side) and Old Bristol Road (New Hampton side), which are connected by an existing bridge.

2. In order to accommodate the bridge replacement work of the NHDOT Central Street over Pemigewasset River project, State project No. 13573A, it is necessary to relocate the existing 3114X circuit at this location. The proposed alignment of the circuit will be similar to the existing location. However, the height of the line will increase above the River and its banks. The relocated line will use the same conductor size and provide the same service capacity that currently exists. There is no known license for the existing water crossing; however, the relocation of the 3114X circuit crossing at this location will be licensed under this petition.

3. The location of the proposed new 34.5 kV crossing of the Pemigewasset River is shown on the attached location map, marked as Exhibit 1.

4. The design and proposed construction of the crossing is shown on the attached PSNH Distribution Business Plan and Profile Drawing entitled "3114X LINE – 34.5 KV, PEMIGEWASSET RIVER WATER CROSSING, NEW HAMPTON AND BRISTOL, NEW HAMPSHIRE", marked as Exhibit 2.

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

6. The proposed crossing will occur between two new wood structures, to be set and located approximately 394 feet apart. The proposed structure on the east side of the Pemigewasset River in New Hampton, number 22/9 is a dead end structure, constructed with a single class 2, 50 foot tall pole. The structure on the west side of the River in Bristol, number 22/8, will also be dead end structure, constructed with a single class 2, 50 foot tall pole. The construction detail for a dead end structure is attached as Figure 3. The conductor wires will be 336 ACSR (Aluminum Clad Steel Reinforced) with 18/1 stranding, the neutral wire will be 4/0 ACSR with 6/1 stranding. The conductor will be sagged using the NESC Heavy Loading condition (0° F, 4 pounds psf wind loading,  $\frac{1}{2}$ " radial ice) at a maximum tension of 2,500 pounds. The neutral wire will be sagged using the NESC Heavy Loading condition (0° F, 4 pounds psf wind loading,  $\frac{1}{2}$ " radial ice) at a maximum tension of 2,000 lbs.

7. Flood water elevations for the Pemigewasset River are not available from Flood Insurance Rate Maps. The map for this area, Flood Insurance Rate Map, Grafton County, New Hampshire, Panel 1178 of 1185, Map Number 33009C1178E26, effective date February 20, 2008 issued by the Federal Emergency Management Agency (FEMA) does not include those elevations. Instead, clearance data is based on the 50-year flood elevation for the River based on elevations taken from the bridge replacement project. The 50-year flood elevation for the River in this location is approximately 357.9 feet. These elevations are based on the National Geodetic Vertical Datum of 1929 (NGVD 29). The 50-year flood elevation is higher than the 10-year flood elevation required by NESC. The higher flood elevation was chosen to provide a more conservative design.

8. The area of the Pemigewasset River as defined by NESC (note 19 to Table 232-1) is  $44\pm$  acres.

9. Using the above design criteria, the maximum sags of the phase and neutral wires and minimum clearances for the crossing have been determined and designed as follows:

- A. <u>NESC Heavy, Phase Wire</u> The maximum sag on the phase wires under this condition is 11.2'. The minimum clearance to land is 38.2'. The minimum clearance to the 50 year flood level is 52.3'.
- B. <u>Minus 20° F, Phase Wire</u> The maximum sag on the phase wires under this condition is 8.8'. The minimum clearance to land is 39.4'. The minimum clearance to the 50 year flood level is 54.1'.
- C. <u>212° F, Phase Wire</u> The maximum sag on the phase wires under this condition is 14.6'. The minimum clearance to land is 36.7'. The minimum clearance to the 50 year flood level is 49.4'.
- D. <u>NESC Heavy</u>, <u>Neutral Wire</u> The maximum sag on the neutral wire under this condition is 12.5'. The minimum

clearance to land is 30.8'. The minimum clearance to the 50 year flood level is 44.4'.

- E. <u>Minus 20° F, Neutral Wire</u> The maximum sag on the neutral wire under this condition is 10.4'. The minimum clearance to land is 31.8'. The minimum clearance to the 50 year flood level is 46.1'.
- F. <u>120° F, Neutral Wire</u> The maximum sag on the neutral wire under this condition is 13.2'. The minimum clearance to land is 30.5'. The minimum clearance to the 50 year flood level is 43.7'.
- G. <u>Minimum Clearance, Phase Wire</u> –212°F operating conditions (item C above), results in the minimum clearance for phase conductors. The minimum clearances expected under those conditions are 36.7' to land and 49.4' to the 50 year flood level. The required minimum clearance from the phase wires to land based on NESC Table 232-1.2 is 18.5'. The required minimum clearance from phase wire to the water surface based on NESC Table 232-1.7.b, is 28.5'. The crossing design as proposed exceeds the NESC requirements.
- H. <u>Minimum Clearance, Neutral Wire</u> 120°F operating conditions (item F above), results in the minimum clearance for the neutral wire. The minimum clearances expected under that condition is 30.5' to land and 43.7' to the 50 year flood level. The required minimum clearance from the neutral to land based on NESC Table 232-1.2 is 15.5'. The required minimum clearance from the neutral wire to the water surface based on NESC Table 232-1.7.b, is 25.5'. The crossing design as proposed exceeds the NESC requirements.
- <u>Minimum Phase to Neutral Clearance</u> –The conditions which would result in the minimum clearance between these lines is a winter condition with the phase wires at NESC Heavy Loading (item A above) and the neutral at -20° F (item E above). This could occur after an ice storm if the neutral shed ice before the conductors. Under those conditions the phase to neutral clearance would be 5.9'. Based on NESC Table 235-6 section 2a, the minimum clearance should be 23.0 inches (1.92 feet)

10. There are no NHDES or NHDOT permits necessary specifically for the construction of this crossing.

11. The proposed crossing has been designed and will be constructed, maintained and operated by PSNH in accordance with the NESC.

12. The poles for this crossing are both to be located within a public street rightof-way for which PSNH has been granted pole licenses. The license for the new pole on the west side of the River in Bristol is license #41-0253. The license for the new pole on the east side of the River in New Hampton is license #41-0199.

13. 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 Pemigewasset River. Minimum safe line clearances above the River surface and affected shorelines will be maintained at all times. The use and enjoyment by the public of the River will not be diminished in any material respect as a result of the overhead line crossing.

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 over and across the public waters of the Pemigewasset River in Bristol and New Hampton, New Hampshire, as specified in the petition; and
- c. Issue an Order Nisi and orders for its publication.

Dated at Manchester this 29th day of September, 2009.

Respectfully submitted,

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE By Its Attorney alm

Christopher J. Allwarden Senior Counsel, Legal Department PSNH Energy Park 780 North Commercial Street Manchester, NH 03101 (603) 634-2459





