



# STATE OF NEW HAMPSHIRE

## Inter-Department Communication

**DATE:** 16 September 2010

**AT (OFFICE):** NHPUC

**FROM:** Tom Frantz – Director, Electric Division

**SUBJECT:** DE 10-206: Petition by PSNH for a License to Construct and Maintain Electric Lines over and across the Warner River in the Town of Warner

**TO:** Chairman Getz, Commissioners Below and Ignatius  
Executive Director Howland

On August 5, 2010, Public Service Company of New Hampshire (PSNH) filed a petition with the Commission under RSA 371:17 for a license to construct and maintain electric lines over and across the Warner River in Warner, New Hampshire. PSNH supplemented its filing on September 9, 2010. PSNH states in its petition that the crossing is required to accommodate area load growth and that these facilities are an integral part of PSNH's distribution system.

PSNH currently operates and maintains a single-phase 19.9 kV distribution line, designated the 311X9 circuit in Warner. The 311X9 line crosses over the Warner River approximately eight feet east of where NH Rt. 27 crosses the Warner River. PSNH does not propose to change the alignment of the crossing or the single phase wire or neutral wire, but is proposing to add two new overhead phases to the existing 311X9 circuit. The result will be a three-phase 19.9 kV circuit. PSNH states there is no known Commission license for this line. PSNH is seeking a license for both the existing crossing and the proposed additional two overhead phases.

Staff employed the Accion Group Inc. (Accion) to review PSNH's petition. Accion filed an electronic memo of its review of PSNH's petition with Staff on September 13. Accion stated that "...PSNH has provided sufficient information and data to justify construction of new electric lines across public waters at this location" and that "...PSNH assures the Commission that the new overhead facilities will be properly constructed, operated, and maintained in accordance with the requirements of the NESC, ANSI C2-2007." Accion also stated that "...if the proposed facilities are constructed, operated, and maintained as proposed in its filing, PSNH will provide safe and reliable service to the public based on sound engineering standards and that construction will be in accordance with the 2007 edition of the National Electrical Safety Code." Accion further recommended to Staff that it recommend approval of PSNH's petition, but add a couple of conditions that specified in the Accion report.

Based on the recommendation of Accion and Staff's review of the filing, Staff recommends that the Commission grant PSNH a license to construct and maintain both the existing and proposed electric lines over across the Warner River as recommended by Accion in its report. I have attached Accion's report to this memo.

Please contact me if you have any questions or would like to discuss this matter.

**ACCION REVIEW OF THE PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
PETITION TO CROSS PUBLIC WATERS OF THE WARNER RIVER  
IN THE TOWN OF WARNER, NEW HAMPSHIRE**

September 13, 2010

**REVIEW SUMMARY**

On August 5, 2010, Public Service Company of New Hampshire (PSNH) filed a petition with the Commission pursuant to RSA 371:17 for a license to construct and maintain electric lines across the Warner River in Warner, New Hampshire. PSNH supplemented its filing on September 9, 2010, with additional information. PSNH states that the addition of two phases to the existing 311X9 19.9kV single phase crossing (with neutral conductor) is required to accommodate load growth in the area, that the reasonable requirement of service to the public in the area cannot be met without the additional facilities, and that these facilities are an integral of the PSNH distribution system. The existing line was not previously licensed for a public water crossing. PSNH seeks to license both the existing crossing and additional facilities in this petition. The line designation will remain 311 X 9.

In support of its petition, PSNH submitted related exhibits as follows: a location plan depicting the geographic location of the proposed crossing (Exhibit 1); a plan and profile drawing depicting the location and projected elevations of the proposed crossing (Exhibit 2); a construction detail drawing (Northeast Utilities Construction Standard DTR 10.211) depicting the construction specifications of the proposed tangent and small angle structure (Exhibit 3); and a construction detail drawing (Northeast Utilities Construction Standard DTR 10.217) depicting the construction specifications of the proposed large corner (dead-end) structure.

PSNH states that the new 311X9 34.5kV crossing will have the same alignment as the existing unlicensed crossing and will use the existing poles at the crossing location. PSNH will add the new facilities by installing 10-foot cross arms on the existing poles. With the new crossing constructed, one phase conductor will be 3 feet to the side of the traveled way of New Hampshire Route 27. PSNH further states that it has previously obtained pole licences for the southerly structure (#13789) and the northerly structure (#9402-10). Additionally, PSNH states that no New Hampshire Department of Environmental Services or New Hampshire Department of Transportation permits are necessary for the construction of this crossing.

As designed by PSNH, the proposed crossing will consist of a single class 2 45-foot wood pole tangent and small angle structure on the southerly side of the river (structure 6/11) and a single class 2 45-foot dead-end structure on the northerly side of the river (structure 6/11X) with a span of 218 feet between them. Each of the existing poles will be fitted with a 10 foot

cross arm and the new phase conductors will be spaced horizontally 4.5 feet and 5 feet apart from the existing conductor on the cross arm. The neutral conductor will maintain its position on the pole 6 feet 10 inches below the new phase conductors. Again, for conservatism, PSNH assumed that the phase conductor adjacent to the traveled way was above the traveled way.

The existing phase and neutral conductors are #2 Aluminium Clad Steel Reinforced (ACSR) conductors with 6/1 stranding, tensioned to a maximum of 1,395 pounds, and sagged to National Electrical Safety Code (NESC), American National Standards Institute (ANSI) C2-2007 Heavy Load Conditions (0 degrees F, 4 pounds per square foot wind loading, and ½ inch radial ice). The new phase conductors will be 1/0 ACSR with a 6/1 stranding, tensioned to a maximum of 2,000 pounds, and sagged to NESC Heavy Load Conditions.

PSNH determined that the 100-year flood level at this location of the Warner River is 390 feet using the elevations contained in the Flood Insurance Rate Map, Merrimack County, Panel 313 of 705, Map Number 33013C0313E with an effective date of April 19, 2010, issued by the Federal Emergency Management Agency and are based on the National Geodetic Vertical Datum of 1929. PSNH stated that it used the 100-year flood for water elevations in its design instead of the normal flood level, or 10-year flood level, required by the NESC for the purpose of conservatism.

PSNH calculated the surface area of the crossing according to Note 19 to Table 232-1 of the NESC and found that the design surface area was 134+/- acres. For crossing of waters suitable for sailing of over 20 to 200 acres, NESC Table 232-1.7.b requires a water surface clearance of 28.5 feet for phase conductors and 25.5 feet for neutral conductors that meet Rule 230C1. NESC Table 232-1.2 also requires that the clearance to the land surface or traveled way be 18.5 feet for phase conductors and 15.5 feet for neutral conductors that meet Rule 230C1.

PSNH investigated a multitude of weather and loading conditions for its design. The conditions investigated include ANSI C2-2007 Heavy Load Conditions, minus 20 degrees F ambient temperature for the phase and neutral conductors, 120 degrees F ambient temperature for the neutral conductor and 212 degrees F for the phase conductors. PSNH used these design conditions and combinations thereof to determine the minimum clearance of the conductors to the water, land surfaces, traveled way, and between the phase and neutral conductors.

As designed by PSNH<sup>1</sup>, the maximum sag of the phase conductors would occur when the phase conductors are at 212 degrees F. At this condition, PSNH calculates that at minimum clearance, the phase conductors would remain 44.7 feet above the 100-year flood level of 390

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<sup>1</sup> The clearance information presented in this petition is for the new phase conductors. PSNH states that the existing phase conductor (of different size) was checked and did not create any minimum clearances for the loading conditions studied.

feet, 35.2 feet above the land on the south side of the river, and 33.2 feet above the traveled way of the bridge. PSNH calculates that the maximum sag of the neutral conductor occurs when it is at NESC Heavy Load Conditions. At these conditions, PSNH calculates that at minimum clearance, the neutral conductor would remain 38.2 feet above the 100-year flood level of 390 feet, 28.8 feet above the land on the south side of the river, and 26.7 feet above the traveled way of the bridge. In addition, the minimum distance requirement between the phase conductors and the neutral conductor according to NESC Table 235-6-2a is 23.01 inches (1.92 feet). PSNH calculates that the minimum distance between the phase and neutral conductors is 4.4 feet when the phase conductors are at ANSI Heavy Load Conditions and the neutral conductor is at minus 20 degrees F without ice. As designed, all clearances exceed NESC requirements.

PSNH states that the use and enjoyment of these waters by the public will not be diminished in any material respect as a result of the proposed electric line crossing. PSNH further attests that the construction of the crossing will be constructed, maintained, and operated in accordance with the requirements of the NESC, ANSI C2-2007.

## **CONCLUSIONS AND RECOMMENDATIONS**

Accion reviewed the petition and associated technical information filed by PSNH in support of its petition.

Accion found that PSNH provided sufficient information and data to justify construction of new electric lines across public waters at this location.

Accion found that PSNH assures the Commission the new overhead facilities will be properly constructed, operated, and maintained in accordance with the requirements of the NESC, ANSI C2-2007.

Accion concluded that if the proposed facilities are constructed, operated, and maintained as proposed in its filing, PSNH will provide safe and reliable service to the public based on sound engineering standards and that construction will be in accordance with the 2007 edition of the National Electrical Safety Code.

Accion recommends that Staff recommend approval of PSNH's petition to the Commission.

Accion further recommends that the Staff recommend the Commission include the following additional conditions in its order:

- Require that all future reconstruction to this approved crossing shall conform to the requirements of the National Electrical Safety Code and all other applicable safety standards in existence at that time.

- Require that PSNH maintains and operates this crossing in conformance with the National Electrical Safety Code.