**Docket Number DE 09-185**

**Liberty Review of the Public Service Company of New Hampshire Petition to Cross Public Waters of the Pemigewasset River in New Hampton and Bristol, New Hampshire**

**November 1, 2009**

**Review Summary**

On September 29, 2009, 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 Pemigewasset River in New Hampton and Bristol, New Hampshire. PSNH states that the rebuild of the existing 3114X 34.5 kV crossing is required to accommodate reconstruction of the adjacent bridge by the New Hampshire Department of Transportation (NHDOT), State Project No. 13573A and that the reasonable requirement of service to the public in the area cannot be met without the facilities replaced.

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); and a construction detail drawing (Northeast Utilities Construction Standard DTR 10.219) depicting the construction specifications of the proposed structures (Exhibit 3).

PSNH states that the new 3114X 34.5kV crossing will have an alignment similar to the existing unlicensed crossing and remain within the public street right-of-way, but will be of taller construction. PSNH further states that it has obtained pole licences for both of the proposed structures (#41-0199 in New Hampton and #41-0253 in Bristol). PSNH further states that no New Hampshire Department of Environmental Services or NHDOT permits are necessary for the construction of this crossing.

As designed by PSNH, the proposed crossing will consist of single class 2 wood pole dead end structures on each side of the Pemigewasset River with a span of 394 feet between them. The new dead end structure on the westerly (Bristol) side of the river will consist of a 50 foot pole with a 10 foot cross arm and is designated as structure #22/8. The phase conductors will be spaced horizontally 4.5 feet apart on the cross arm. The neutral conductor will be mounted to the pole 6 foot 2 ½ inches below the conductor on the pole. The structure on the easterly (New Hampton) side of the river will be similarly constructed and designated as structure #22/9.

The three phase conductors will be 336 kcmil ACSR conductors with 18/1 stranding, will be tensioned to 2,500 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 neutral conductor will be 1/0 ACSR with a 6/1 stranding, will be tensioned to 2,000 pounds, and also sagged to NESC Heavy Load Conditions.

PSNH determined that the 50-year flood level at this location of the Pemigewasset River is 357.9

feet using the elevations contained in the bridge reconstruction project which are based on the National Geodetic Vertical Datum of 1929. PSNH states that the Flood Insurance Rate Map (FIRM), County of Grafton, Panel 1178 of 1185, Map Number 33009C1178E26 with an effective date of February 20, 2008 issued by the Federal Emergency Management Agency did not contain the desired flood level information. PSNH stated that it used the 50-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 surface area was 44+/- 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 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 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, and between the phase and neutral conductors.

As designed by PSNH, 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 49.4 feet above the 50-year flood level of 357.9 feet and 36.7 feet above the land on the east side of the river. PSNH calculates that the maximum sag of the neutral conductor occurs when it is at a temperature of 120 degrees F. At this condition, PSNH calculates that at minimum clearance, the neutral conductor would remain 43.7 feet above the 50-year flood level of 357.9 feet and 30.5 feet above the land on the east side of the river. In addition, the minimum distance requirement between the phase conductors and the neutral conductor according to NESC Table 235-6-2a is 23 inches (1.92 feet). PSNH calculates that the minimum distance between the phase and neutral conductors is 5.9 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 by the public of these waters 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**

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

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

Liberty found 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.

Liberty 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.

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