

Docket Number DE 09-199

Liberty Review of the Public Service Company of New Hampshire Petition to Cross Public Waters of Mill Creek and the Ashuelot River in Keene, New Hampshire

November 2, 2009

Review Summary

On October 16, 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 Mill Creek and the Ashuelot River in Keene, New Hampshire. PSNH states in its petition that the crossings are required in order that a new 12.47 kV distribution line may be constructed to serve growth in demand and to obtain a greater level of reliability in the Keene area. The new circuit will be added to the existing W-15 12.47 kV circuit that crosses Mill Creek (double circuit crossing) and to the existing W-9 and W-15 12.47 kV circuits that cross the Ashuelot River (triple circuit crossing). PSNH states that reasonable requirements of service to the public in the area cannot be met without the new facilities. The petition requests licenses for all 5 crossings as the existing 3 crossings are not licensed.

In support of its petition, PSNH submitted related exhibits as follows: a location plan depicting the geographic location of the existing and proposed crossings (Exhibit 1); a plan and profile drawing depicting the location and projected elevations of the existing and proposed crossings (Appendix A, Exhibit B-1 and Appendix B, Exhibit B-1 for Mill Creek and the Ashuelot River respectively); and construction detail drawings depicting the construction specifications of the proposed structures (Appendix A, Exhibits A2-A4 and Appendix B, Exhibits B2-B3 for Mill Creek and the Ashuelot River respectively).

PSNH states that the new and the existing unlicensed crossings will either remain within existing rights-of-way or on land that it owns. PSNH further states that no New Hampshire Department of Environmental Services or NHDOT permits are necessary for the construction of this crossing.

PSNH determined that the 100-year flood level at this location of Mill Creek and the Ashuelot River is 471 feet from the Flood Insurance Rate Map (FIRM), City of Keene, New Hampshire, Cheshire County, panel 266 of 610, Community Panel Numbers 330023 0266E and 330026 0266E, effective date May 23, 2006 and 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 Mill Creek crossings according to Note 19 to Table 232-1 of the National Electrical Safety Code (NESC) and found that the surface area was 1.0+/- acres. The surface area of the Ashuelot River crossings was similarly calculated to be 10.0+/- acres. For crossing of waters suitable for sailing of less than 20 acres, NESC Table 232-1.7.a requires a water surface clearance of 20.5 feet for phase conductors and 17.5 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(also NESC) Heavy Load Conditions (0 degrees F, 4 pounds per square foot wind loading, and ½ inch radial ice), minus 20 degrees F ambient temperature for the phase and neutral conductors, and 120 degrees F ambient temperature for the neutral conductor and for the phase conductors. (The phase conductors are supported by the neutral messenger cable making the sag of the phase conductors the same as the neutral, but 2 feet lower). 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. PSNH further states that the projects are not located in the special wind region identified in Figure 250-2(e) of the NESC.

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.

Mill Creek

As designed by PSNH, the proposed Mill Creek crossing will consist of a single class 1 40-foot wood angle structure (#185-3) on the easterly side of the creek and a single class 1 40-foot tangent structure (#185-4) on the westerly side of the creek with a span of 122 feet between them. The conductors will be of spacer cable bracket construction in a vertical configuration at structure #185-3 and a horizontal configuration at structure #185-4.

The three phase conductors of the new W-185 line will be 795 kcmil aluminium conductors with 19 strands and the three phase conductors of the existing W-15 line will be 477 kcmil aluminium conductors with 19 strands. The neutral conductor will be 052 AWA (Alumoweld and aluminium) with a 5/2 stranding on each line. All conductors will be tensioned to 2,000 pounds, and sagged at 60 degrees F.

Due to the larger conductor size of the new W-185 circuit and its lower attachment height on structure #185-3, the clearances for the W-185 line are presented here as they are more restrictive. As designed by PSNH, the maximum sag of the phase conductors would occur under NESC Heavy Load Conditions. At these conditions, PSNH calculates that at minimum clearance, the phase conductors would remain 25.1 feet above the 100-year flood level of 471 feet and 27.3 feet above the land on the west side of the creek. PSNH calculates that the maximum sag of the neutral conductor also occurs at NESC Heavy Load Conditions. At these conditions, PSNH calculates that at minimum clearance, the neutral conductor would remain 27.1 feet above the 100-year flood level of 471 feet and 29.3 feet above the land on the west side of the creek. In addition, there is no minimum distance requirement between the phase conductors and the neutral conductor according to NESC 235.A.2. The required clearance requirements for line conductors is 13.8 inches according to NESC Table 235-6.2.a. The minimum clearance between any conductor of the two lines occurs between the conductors on the W-15 line and the neutral of the W-185 line which is 18 inches at structure #185-3. As designed, all clearances exceed NESC requirements.

Ashuelot River

As designed by PSNH, the proposed Ashuelot River crossing will consist of a single class 1 45-foot wood angle structure (#585-4) on the northerly side of the river and a single class 1 50-foot tangent structure (#585-5) on the southerly side of the river with a span of 217 feet between them. The conductors will be of spacer cable bracket construction in a vertical configuration on one side of the pole and the third circuit will be horizontally configured on the other side of the pole at both structures.

The three phase conductors of the new W-185 line will be 795 kcmil aluminium conductors with 19 strands, the three phase conductors of the existing W-15 line will be 477 kcmil aluminium conductors with 19 strands and the three phase conductors of the existing W-9 line will be 336 kcmil aluminium conductors with 19 strands. The neutral conductor will be 052 AWA with a 5/2 stranding on each line. All conductors will be tensioned to 2,000 pounds, and sagged at 60 degrees F.

Due to the lower attachment height on both structures, the clearances for the W-9 line are presented here as they are more restrictive. As designed by PSNH, the maximum sag of the phase conductors would occur under NESC Heavy Load Conditions. At these conditions, PSNH calculates that at minimum clearance, the phase conductors would remain 22.8 feet above the 100-year flood level of 471 feet and 24.9 feet above the land on the north side of the river. PSNH calculates that the maximum sag of the neutral conductor also occurs at NESC Heavy Load Conditions. At these conditions, PSNH calculates that at minimum clearance, the neutral conductor would remain 24.8 feet above the 100-year flood level of 471 feet and 26.9 feet above the land on the north side of the river. In addition, there is no minimum distance requirement between the phase conductors and the neutral conductor according to NESC 235.A.2. The required clearance requirements for line conductors is 13.8 inches according to NESC Table 235-6.2.a. The minimum clearance between any conductor of the two lines occurs between the conductors on the W-15 line and the neutral of the W-185 line which is 18 inches at structure #585-4. As designed, all clearances exceed NESC requirements

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.