

**DE 05-142**

**PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE**

**Petition for License to Construct and Maintain Electric Lines Over and Across the Public Waters of the Nashua River in the City of Nashua, New Hampshire**

**Order *Nisi* Granting License to Construct and Maintain Electric Lines Over and Across Public Waters**

**ORDER NO. 24,523**

**September 30, 2005**

On September 2, 2005, Public Service Company of New Hampshire (PSNH) filed a petition pursuant to RSA 371:17 with the New Hampshire Public Utilities Commission (Commission) for a license to construct and maintain electric lines over and across the Nashua River in the City of Nashua, New Hampshire via three new crossings. PSNH filed an amended petition on September 20, 2005 and revised its amended petition on September 23, 2005. PSNH states that the new lines are required to meet the reasonable requirements of service to the public in Nashua and the surrounding communities. PSNH states that the three new overhead line crossings will replace three existing direct buried crossings and underground cables from PSNH's Bridge Street Substation to the cable riser locations on the northerly side of the Nashua River. The existing crossings were previously licensed by the Commission under Order No. 10,945 (May 15, 1973) in Docket DE-6448.

PSNH proposes to build three new overhead 34.5 kilovolt (kV) distribution line crossings that will connect the existing Bridge Street Substation in Nashua to distribution systems in Nashua and the surrounding communities. The three line crossings are designated as line 3020X (Crossing A), line 383 (Crossing B) and line 353 (Crossing C). The new overhead

crossings will be approximately ½ mile west of the confluence of the Merrimack and Nashua Rivers, and just west of an existing railroad crossing of the Nashua River.

In support of its petition, PSNH submitted a location plan (Exhibit #1) and profile drawings of the three crossings (Exhibits #2-A for Crossing A, Exhibit #2-B for Crossing B, and Exhibit #2-C for Crossing C), 34.5 kV construction standards for single pole Type A tangent structures (Figure #1), and single pole Type SB-2 angle structures with a 25 degree to 45 degree angle (Figure #2). PSNH states that cables on all three existing circuits have failed one or more times within the last year with the most recent failure occurring on September 14, 2005, and that the three existing crossings are in need of replacement for safety and reliability reasons. PSNH also states that the three new crossings will improve the reliability of the local distribution system and thus improve the reliability of electric service to the Nashua area. PSNH further states that once the new overhead crossings have been constructed, the existing facilities will be de-energized and either abandoned in place, or removed as directed or required by the New Hampshire Department of Environmental Services.

PSNH states that it investigated various alternatives for these crossings and determined that replacing the existing submarine cable crossings with overhead crossings is good utility practice. In support of its determination, PSNH states that installation of new underwater cable crossings, either by trenching or directional boring, would be more costly than overhead construction, and would entail greater environmental impacts to the Nashua River and riverbank areas without offering any increase in reliability over that provided by overhead construction. PSNH further offers that replacing the three existing crossings with new, multiple-circuit configurations on the 115 kV lines crossing upriver from the location of the proposed new

crossings would require a more costly and less reliable rebuild of the existing 115 kV structures because the existing 115 kV structures are not capable of supporting the additional conductors.

The petition as amended and revised asserts that the construction of each of the three crossings will consist of structure #2, a new 50-foot class 3 single wood pole tangent structure (Type A) on the southerly side of the crossing, and structure #3, a new 65-foot class 2 single wood pole angle structure (Type SB-2) on the northerly side of the crossing. The span between these two structures will be 323.82 feet for all three crossings.

PSNH attests that in designing the proposed crossing it investigated a multitude of weather and loading conditions as established by the National Electrical Safety Code (NESC), American National Standards Institute (ANSI) C2-2002 "Heavy Loading Conditions" (0 degrees F, 4 pounds per square foot wind loading, and ½ inch radial ice), minus 20 degrees F conductor temperature, 212 degrees F conductor temperature, and 120 degrees F conductor temperature. PSNH used these design conditions to determine the minimum clearance of the conductors to the water surface, land surface, and the minimum distances between the phase conductors and the neutral conductor. PSNH depicted the limiting combinations in plan and profile drawings as presented in Exhibit #2-A, Exhibit #2-B and Exhibit # 2-C for each of the three crossings.

According to PSNH's proposal, the 3-phase conductors will be 477 MCM 18/1 ACSR conductors, constructed in a horizontal configuration on the southerly side of the crossings with 4-foot 8-inch spacing. The neutral conductor on the southerly side of the crossings will be a 4/0 6/1 ACSR conductor mounted on the pole and will be located 7 feet, 2 inches below the center phase conductor on the pole, and 6 feet, 2 inches below the lowest phase conductor mounted on the cross arm. The 3-phase conductors will be constructed in vertical

configuration on the northerly side of the crossings with 5 feet, 0 inch spacing. The neutral conductor on the northerly side of the crossings will be mounted on the pole and will be located 7 feet, 0 inches below the lowest phase conductor. Phase conductors will be tensioned to 3,000 pounds, and sagged to NESC, ANSI C2-2002 Heavy Loading Conditions. Neutral conductors will be tensioned to 2,000 pounds and also sagged to NESC, ANSI C2-2002 Heavy Loading Conditions.

According to PSNH's analysis, the maximum phase conductor sag of 8.8 feet will occur at a conductor temperature of 212 degrees F. At this elevated conductor temperature, the phase conductors remain 28.2 feet above the Nashua River 100-year flood level of 114 feet above mean sea level as depicted on Federal Emergency Management Agency (FEMA) flood insurance rate maps, and approximately 35 feet above the land surface under the crossings. PSNH states that it used this information for water elevation because data regarding the normal flood level or 10 year flood levels required by the NESC was not available, and because the 100-year flood level would exceed the 10 year flood elevation.

PSNH points out that according to NESC Table 232-1, Note 19, if the proposed crossings were unobstructed, the one mile surface area requirement would result in a water surface area of 24.2 acres. Consequently, NESC Table 232-1 would indicate a water surface clearance of 28.5 feet for phase conductors and a water surface clearance of 25.5 feet for neutral conductors (Rule 230C1 for water surface areas over 20 to 200 acres). NESC Table 232-1, Note 20, allows for reduction of the clearance requirements calculated under Note 19 if the one mile segment is obstructed. PSNH determined that the proposed crossings are obstructed crossings within the meaning of NESC.

PSNH points out that at the location of the proposed crossings, obstructions occur both on the upstream and downstream side. The unobstructed river length containing the proposed crossings is 2,800 feet and creates a water surface area of 12.8 acres. The obstruction on the easterly side of the crossings is a railroad bridge which has an elevation of about 110 feet at the top of the bridge and the obstruction on the westerly side of the crossings is a highway bridge which has an elevation of about 112 feet at the top of the bridge. According to NESC Table 232-1, Note 20, the clearance requirements may be reduced by the differences between the reference clearances stated in Table 232-3 (24.0 feet for water surface areas of over 20 to 200 acres) and the obstruction, provided that the minimum clearance allowed is based on the actual water surface area between the obstructions. In this case, the obstructions are actually lower than the design flood level, so the clearance to the water surface of the surface area between the obstructions will govern. NESC Table 232-1 requires that a clearance of 20.5 feet for phase conductors be maintained for a water surface area of less than 20 acres. NESC Table 232-1 requires that the primary conductor clearances to the land surface under the crossing be 18.5 feet.

PSNH has calculated that the maximum neutral conductor sag of 8.3 feet will occur at a conductor temperature of 120 degrees F. At this conductor temperature, the neutral conductor would remain 24.1 feet above the Nashua River 100 year flood level of 114 feet above mean sea level as depicted on the FEMA flood insurance rate maps, and 24.3 feet above the land surface. PSNH has determined that according to NESC Table 232-1, Note 20, the design water surface area for the obstructed crossing is 12.8 acres. For water areas of less than 20 acres that are suitable for sailing, NESC Table 232-1 requires that neutral conductors that meet Rule 230C1 maintain a clearance to the water surface of 17.5 feet, and NESC Table 232-1 requires that

neutral conductor clearances to the land surface under the crossings be 15.5 feet. PSNH therefore concludes that its meets the requirements of NESC.

PSNH determined that the minimum distance between the phase conductors and the neutral conductor occurs when the phase conductors are at their emergency temperature of 164 degrees F (temperature at the 950 ampere conductor limit) and the neutral conductor is at minus 20 degrees F, the air ambient temperature. Under these conditions, the clearance would be 22.8 inches between the neutral and the phase conductor directly above it. Due to the 4 foot, 8 inch to 5 foot, 0 inch spacing of the other phase conductors, their clearances would be greater. NESC Table 235-5, Section 2a requires that the minimum distance between the phase conductors and the neutral conductor be 20.9 inches. PSNH points out that its design specifications meets the NESC standards.

According to PSNH, no wetland permits are required in connection with the construction of the three crossings. PSNH has stated that PSNH owns the land in fee where structures #2 and #3 will be constructed for all three crossings.

Also according to PSNH, the Nashua River is designated as a prime wetland by the City of Nashua, and therefore a special exception is required from the City of Nashua Zoning Board of Adjustment for construction of the proposed crossings in a wetland buffer. PSNH further states that it has made application to the City of Nashua Zoning Board of Adjustment to construct the crossings, and expects that its application will be granted.

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 aerial line crossings. PSNH further attests that the construction of the aerial electric lines will be constructed, maintained, and

operated in accordance with the requirements of the NESC, ANSI C2-2002.

RSA 371:17 provides in part that whenever it is necessary, in order to meet the reasonable requirements of service to the public, that any public utility should construct a line of poles or towers and wires and fixtures thereon over or across any of the public waters of New Hampshire, it shall petition the Commission for a license to construct and maintain the same. “Public waters,” as defined in RSA 371:17, means “all ponds of more than ten acres, tidewater bodies, and such streams or portions thereof as the Commission may prescribe.” Upon review of the presented information, the Commission prescribes the part of the Nashua River under the proposed aerial electric lines as being “public waters” under RSA 371:17.

Based on the information presented by PSNH and Staff’s recommendation, we find this crossing necessary for PSNH to meet the reasonable requirements of reliable service to the public within PSNH’s authorized franchise area and the requested license may be exercised without substantially affecting the public rights in the waters of the Nashua River. We find that the three crossings are in the public good and we will approve the petition on a *nisi* basis in order to provide any interested party the opportunity to submit comments on said petition or to request a hearing.

**Based upon the foregoing, it is hereby**

**ORDERED *NISI***, that subject to the effective date below, PSNH is authorized, pursuant to RSA 371:17 *et seq.*, to construct, maintain and operate the aerial electric lines over and across the Nashua River in Nashua, New Hampshire described in its petition and depicted on plans and drawings submitted September 2, 2005, amended on September 20, 2005, and revised on September 23, 2005, and on file with this Commission; and it is

**FURTHER ORDERED**, that PSNH file a copy of the approval of a special exception for the crossings by the City of Nashua Zoning Board of Adjustment with the Commission for its records; and it is

**FURTHER ORDERED**, that PSNH conform to all requirements of the New Hampshire Department of Environmental Services regarding the abandonment or removal of the existing cable crossings and that a copy of said requirements be filed with the Commission for its records; and it is

**FURTHER ORDERED**, that PSNH shall provide a copy of this order to the (i) City Clerk of Nashua, (ii) New Hampshire Attorney General and the owners of the land bordering on said public waters at the location of the river crossings, pursuant to RSA 371:19, (iii) pursuant to RSA 422-B:13, New Hampshire Department of Transportation and the Office of Secretary, U.S. Department of Commerce, and (iv) the New Hampshire Department of Environmental Services by first class mail, no later than October 10, 2005, and to be documented by affidavit filed with this office on or before October 24, 2005; and it is

**FURTHER ORDERED**, that PSNH shall cause a copy of this Order *Nisi* to be published once in a statewide newspaper of general circulation or of circulation in those portions of the state where operations are conducted, such publication to be no later than October 10, 2005 and to be documented by affidavit filed with this office on or before October 24, 2005; and it is

**FURTHER ORDERED**, that all persons interested in responding to this Order *Nisi* be notified that they may submit their comments or file a written request for a hearing which states the reason and basis for a hearing no later than October 17, 2005 for the Commission's consideration; and it is

**FURTHER ORDERED**, that any party interested in responding to such comments or request for hearing shall do so no later than October 24, 2005; and it is

**FURTHER ORDERED**, that this Order *Nisi* shall be effective October 31, 2005, unless PSNH fails to satisfy the publication obligation set forth above or the Commission provides otherwise in a supplemental order issued prior to the effective date.

By order of the Public Utilities Commission of New Hampshire this thirtieth day of September, 2005.

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Thomas B. Getz  
Chairman

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Graham J. Morrison  
Commissioner

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Michael D. Harrington  
Commissioner

Attested by:

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Debra A. Howland  
Executive Director & Secretary