

**DE 06-006**

**PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE**

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

**Order *Nisi* Granting License to Construct and Maintain Electric Lines Over and Across  
The Public Waters of the Merrimack River in Concord, New Hampshire**

**ORDER NO. 24,586**

**February 3, 2006**

On January 10, 2006, Public Service Company of New Hampshire (PSNH) filed a petition with the New Hampshire Public Utilities Commission (Commission) pursuant to RSA 371:17 for a license to construct and maintain electric lines over and across the Merrimack River in the City of Concord, New Hampshire. PSNH is a public utility engaged in the generation, transmission, distribution and sale of electricity in the State of New Hampshire. In the Petition, PSNH states that in order to meet the reasonable requirements of service to the public, it intends to construct and maintain a new overhead 34.5 kV electric line between the PSNH Oak Hill Substation and the Unitil Energy Systems (Unitil) Penacook Substation in Concord. PSNH states that the new overhead line crossing will be constructed adjacent to and south of an existing crossing (line 3122).

PSNH explains that the new line crossing will be constructed in an existing PSNH right-of-way on the east and west sides of the Merrimack River, and will cross parallel to and southerly of the existing PSNH overhead 34.5 kV line 3122 crossing which was previously licensed by the Commission under Order No. 12,219 (April 21, 1976) Appendix 10, Exhibits 10B1 and 10B2. (*See* Docket No. DE 76-22). PSNH attests that upon construction, the new 34.5 kV line will be designated as the 3122 line, and the existing 3122 line will be re-designated as

the 317 line. The new overhead crossing will be constructed at a location approximately 0.6 miles north of the Sewalls Falls dam location and approximately 0.5 miles south of the Merrimack River crossing of Sewalls Falls Road.

PSNH avers that the new 3122 line with its associated river crossing is being constructed to address the contingent loss of the 115-34.5 kV 60MVA transformer at the PSNH Garvins Substation in Bow, New Hampshire. PSNH states that loss of the Garvins transformer would result in violation of PSNH's system design criteria limiting load isolation to not more than 30 MW during a single contingency, because PSNH's existing 3122 line from PSNH's Oak Hill Substation no longer has adequate thermal capacity to pick up sufficient load served by Unital out of Unital's Penacook Substation, and will exceed the emergency rating of the line. PSNH attests that construction of a new, second 34.5 kV line, to be operated in parallel with the existing 34.5 kV line between Oak Hill and Penacook, will alleviate the thermal overload condition on the existing line for the Garvins transformer contingency and will improve the reliability of the PSNH system and service to Unital's Concord-area customers.

With its petition, PSNH submitted a map identifying the location of the existing and proposed new overhead line crossings (Exhibit 1) and PSNH System Projects Drawings entitled Plan and Profile, New Line 3122—34.5kV, Merrimack River Crossing (Drawing No. D-7649-422) marked as Exhibit 2. According to PSNH, the new line 3122 will cross the Merrimack River on 3-pole wood deadend structures. The structure on the west side of the river (new structure #20) will be a new 50 foot 3-pole wood deadend structure Type DA. The structure on the east side of the river (new structure #21) will be a 65 foot 3-pole wood deadend structure Type DA. PSNH attached to its petition a detail of structure Type DA in Exhibit 2 (Figure 1). PSNH states that the crossing span between these two structures will be 687.6 feet.

As illustrated on Figure 1, the phase wires will have a 10 foot separation at the structure, and the neutral wire will be carried on the structures by an insulated support bracket 6 feet 5 inches down from the left phase wire. PSNH explains that the phase wires carried on these structures will be 477 ACSR 18/1, with a 4/0 ACSR 6/1 neutral. PSNH's petition recites that the phase conductors will be tensioned to 5,000 pounds, and sagged to 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). The neutral conductor will be tensioned to 3,000 pounds and also sagged to NESC, ANSI C2-2002 Heavy Load Conditions.

PSNH offers that it investigated a multitude of weather and loading conditions for its design based on the NESC ANSI C2-2002. In this case, PSNH investigated NESC Heavy Loading Conditions, and conditions at minus 20 degrees F conductor temperature, 212 degrees F conductor temperature, and 100 degrees F conductor temperature. PSNH avers that it used these design conditions and all possible combinations to determine the minimum clearance of the conductors to the water surface and land surface on the easterly side of the crossing, and the minimum distances between the phase conductors and the neutral conductor. PSNH attests that it did not consider clearance to land surfaces on the westerly side of the crossing because that side of the river is not subject to vehicular traffic, due to the steeply sloping natural grade of the land. PSNH depicts these limiting combinations in Exhibit 2.

PSNH states that according to flood insurance rate maps provided by the Federal Emergency Management Agency and the New Hampshire Department of Transportation Bridge

Design,<sup>1</sup> the Merrimack River 100 year flood level is 247.5 feet. PSNH calculated the water surface area for the design of this crossing (54.5 acres) based on the largest average width (450 feet) for a one mile stretch of the Merrimack River in either direction of the Sewalls Falls Road bridge. Using the results of this calculation, PSNH states that it referred to NESC Table 232-1 which provides water clearance and land clearance requirements for water surface areas of 20 to 200 acres.

PSNH states it calculated that the maximum phase conductor sag of 28.2 feet will occur at a conductor temperature of 212 degrees F. At this elevated conductor temperature, PSNH determined that the phase conductors remain 44.5 feet above the 100 year flood level of the Merrimack River. PSNH further calculated that under these conditions the phase conductors would remain 46.4 feet above the land surface at the easterly side of the crossing. PSNH notes that NESC Table 232-1 requires a water surface clearance of 28.5 feet for phase conductors and a primary conductor clearance to the land surface of 18.5 feet. PSNH asserts that the design plan exceeds the NESC standards at this condition.

PSNH calculated that the maximum neutral conductor sag of 28.3 feet will occur at a conductor temperature of 100 degrees F. At this conductor temperature, PSNH determined that the neutral conductor remains 37.4 feet above the Merrimack River 100 year flood level and the neutral conductor remains 38.0 feet above the land surface at the easterly side of the crossing. PSNH points out that NESC Table 232-1 requires that neutral conductors maintain a clearance to the water surface of 25.5 feet, and a clearance to the land surface under the crossing of 15.5 feet. PSNH notes that its design plan exceeds the NESC standards at a conductor temperature of 100

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<sup>1</sup> PSNH states that it used this information for water elevation because the normal flood level or 10 year flood levels required by the NESC were not available, and because the 100 year flood level would be well above the 10 year flood elevation.

degrees.

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 163 degrees F (temperature at the 950 ampere summer conductor limit) and the neutral conductor is at minus 20 degrees F, the air ambient temperature. Under these conditions, the clearance would be 68.4 inches between the neutral and the phase conductor directly above it. Due to the 10 foot and 20 foot additional horizontal distance of the other phase conductors, the actual clearances would be much greater. The applicable NESC standard, 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 plan exceeds the NESC standards at this emergency condition.

According to PSNH, no wetland permits are required in connection with the construction of the crossing. PSNH attests that it owns permanent easement rights in a 100-foot wide easement corridor on both the east and west sides of the Merrimack River in the location of the proposed crossing where structures #20 and #21 will be constructed, and that the construction of the crossing will be maintained within the limits of the easement corridor owned by PSNH.

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.

Staff filed a memorandum in this docket on January 22, 2006, recommending approval of the petition. Staff reported that Mr. Michael D. Cannata, P.E., a consultant

employed by the Commission, reviewed the petition and concluded that PSNH's proposed crossing conforms to the National Electric Safety Code.

Pursuant to RSA 371:17, 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 first 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." Based on the information presented, the Commission prescribes the part of the Merrimack 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 and Unitil's authorized franchise areas and the requested license may be exercised without substantially affecting the public rights in the waters of the Merrimack River. We find that the river crossing is 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 Merrimack River in Concord, New Hampshire and as described in its petition and depicted on plans and drawings submitted January 10, 2006, and on file with this Commission; and it is

**FURTHER ORDERED**, that that the Petitioner shall provide a copy of this order to (i) the City Clerk of Concord, (ii) the New Hampshire Attorney General and the owners of the land bordering on said public waters at the location of the river crossing, pursuant to RSA 371:19, (iii) pursuant to RSA 422-B:13, the 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 February 10, 2006, and to be documented by affidavit filed with this office on or before February 24, 2006; and it is

**FURTHER ORDERED**, that PSNH construct, operate and maintain the aerial lines in accordance with the requirements of the NESC, ANSI C2-2002; and it is

**FURTHER ORDERED**, that the Petitioner 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 February 10, 2006 and to be documented by affidavit filed with this office on or before February 24, 2006; 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 February 15, 2006 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 February 21, 2006; and it is

**FURTHER ORDERED**, that this Order *Nisi* shall be effective February 24, 2006, unless the Petitioner 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 third day of  
February, 2006.

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Thomas B. Getz  
Chairman

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Graham J. Morrison  
Commissioner

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Clifton C. Below  
Commissioner

Attested by:

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ChristiAne G. Mason  
Assistant Executive Director and Secretary