STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DE 07-037

UNITIL ENERGY SYSTEMS, INC.

Petition for License to Construct and Maintain Electric Lines Over the Public Waters of the Exeter River in the Town of Exeter

Order *Nisi* Granting Petition

O R D E R N O. 24,755

May 25, 2007

On March 16, 2007, Unitil Energy Systems, Inc. (UES) filed a petition with the Commission pursuant to RSA 371:17 for a license to construct and maintain electric and communications lines over the Exeter River in Exeter. Because its initial petition omitted information necessary to determine whether the crossing is necessary, UES filed a revised petition on May 1, 2007.

UES stated that the new circuit is necessary due to increased load growth in the Exeter area. According to the company, the increased load growth has created overload conditions on the existing UES lines when UES loses one of its distribution lines feeding Exeter. The proposed structures would support a new 34.5 kV electric circuit, known as 19X3, located in Exeter. According to UES, the license for the new crossings is required to meet the reasonable requirements of service in the Exeter area.

With its petition, UES filed the following exhibits: a plan and profile drawing depicting the location and projected elevations of the proposed crossing (Exhibit 1), a construction detail drawing depicting the construction specifications of the proposed dead end structures (Exhibit 2), a geographic map depicting the location of the proposed crossing (Exhibit 3), and a Federal

Emergency Management Agency (FEMA) National Flood Insurance Program 100-year flood elevation map for Exeter (Exhibit 4). On May 18, 2007, Staff filed a memorandum with the Commission recommending that the Commission grant the license.

Pursuant to its petition, UES plans to connect its Exeter substation on the west side of the Exeter River to its Exeter switching station on the east side of the river with a new electric and communications crossing. A communications cable consisting of a minimum of 12 optic fibers would be used to transmit substation equipment information between the two stations. The company plans to construct the structures on land owned by UES and says the construction will not affect any abutting landowners. UES further states that no wetlands permit is required because no construction will take place on wetlands. UES further states that no other permits are required for construction.

The new crossing would consist of a single span built on structures within the substation fences of the Exeter substation and the Exeter switching station. UES plans the crossing to be located approximately 0.15 miles south of where Route 27 crosses the Exeter River. In the Exeter switching station, UES plans to install a new 40-foot single pole dead end structure using a class 1 pole (Pole 1) and, in the Exeter substation, UES plans to install a new 40-foot single pole dead end structure also using a class 1 pole (Pole 2). The crossing span between these two structures would be 190.0 feet.

According to its revised petition, UES investigated a multitude of weather and loading conditions for its crossing design at the following conditions: the National Electrical Safety Code (NESC), American National Standards Institute (ANSI) standard C2-2007 Heavy Load Conditions (0 degrees F, 4 pounds per square foot wind loading, and ½ inch radial ice); minus 20

degrees F ambient temperatures; 212 degrees F conductor temperature; and 120 degrees F ambient temperature. UES used these design conditions and all possible combinations to determine the minimum clearance of the conductors to the water surface and land surfaces on both sides of the crossing, and the minimum distances between the phase conductors and the neutral conductor and the communications cable. The limiting combinations are depicted on the plan and profile drawing, Exhibit 1.

As designed by UES, the three phase conductors would be 336.4 MCM 19 strand AA conductors, constructed in a horizontal configuration with 4.5 feet distance between them. The neutral conductor would be a 4/0 6/1 ACSR conductor mounted on the pole and located 8.0 feet below the center phase conductor. The communications cable would be lashed to a 3/8 inch steel messenger cable. This cable, also mounted on the pole, would be located 7.0 feet below the center phase conductor. The phase and neutral conductors would be tensioned to 2,000 pounds, and sagged to NESC, ANSI C2-2007 Heavy Load Conditions. The communications cable will be tensioned to 2,500 pounds and also sagged to NESC, ANSI C2-2007 Heavy Load Conditions.

UES determined that the 100-year flood level at this location of the Exeter River is 32.0 fee. UES stated that it used the 100-year flood for water elevations because the normal flood level or 10-year flood levels required by the NESC were not available, and because the 100-year flood levels would likely exceed the 10-year levels.

According to UES, the Exeter River is not suitable for sailing boats at the proposed crossing due to overhanging tree branches and bridges. For crossing of waters not suitable for sailing boats, NESC Table 232-1 requires a water surface clearance of 17.0 feet for phase conductors and 14.0 feet is for neutral conductors and for communication conductors. UES

calculated the clearance to the land is 26.8 feet on the east side of the river and 27.6 feet on the west side of the river. NESC Table 232-1 requires that the clearance to the land surface be 18.5 feet for phase conductors and 15.5 feet conductors for communication conductors.

As designed by UES, the maximum sag of the phase conductors would occur at a conductor temperature of 212 degrees Fahrenheit. At this elevated conductor temperature, the company calculates the phase conductors would remain 21.6 feet above the 100-year flood level of 32.0 feet, 26.8 feet above the land east of the river, and 26.0 feet above the land west of the river, assuming maximum sag over both land locations. UES notes that the design standards exceed the NESC requirements for the phase conductors.

UES calculates that the maximum sag of the neutral conductor will occur at a conductor temperature of 120 degrees F. At this conductor temperature, the neutral conductor remains 16.2 feet above the 100-year flood level of 32.0 feet, 21.4 feet above the land on the east side of the river, and 20.6 feet above the land on the west side of the river, assuming maximum sag conditions at both locations. UES states that the design standard for the neutral conductor also exceeds the NESC requirements.

UES determined that the maximum sag of the communication cable will also occur at a conductor temperature of 120 degrees F. At this conductor temperature, the communication cable remains 17.7 feet above the 100-year flood level of 32.0 feet, 22.9 feet above the land on the east side of the river, and 22.1 feet above the land on the west side of the river, again assuming maximum sag conditions at both locations. According to UES, this design standard also exceeds the NESC requirements.

In addition, UES calculated that the minimum vertical distance between the

communications conductor and other conductors occurs when the phase conductors are at their emergency temperature of 212 degrees and the neutral conductor is at minus 20 degrees, the air ambient. Under these conditions, the minimum vertical clearance would be 24.0 inches between the communications conductor and the center phase conductor above it. NESC Table 35-5, Section 2a. requires that the minimum vertical distance between the phase conductors and neutral or communication conductors be 20.9 inches. UES concludes that the design for the clearance between the phase conducts and communication conductors exceeds the NESC standard.

UES states that the use and enjoyment by the public of these waters would not be diminished in any material respect as a result of the proposed electric line crossing. Finally, UES maintains that it will construct, maintain, and operate the crossing in accordance with the requirements of NESC ANSI C2-2007 standards.

Staff reviewed the proposed crossing and recommended that the Commission grant the requested license to help meet the reasonable need requirements for service to UES' Exeter customers. Staff noted that UES had provided sufficient information to demonstrate that the crossing would be constructed consistent with the NESC, and would be operated and maintained consistent with the engineering standards specified in the 2007 edition of the National Electrical Code.

RSA 371:17 requires public utility planning to construct a new line of poles over, under or across any of the public waters the state, in order to meet "the reasonable requirements of service to the public," to petition the Commission for a license. "Public waters," as defined in RSA 371:17, means "all ponds of more than 10 acres, tidewater bodies, and such streams or

portions thereof as the Commission may prescribe," and includes the portions of the Exeter River covered by the present petition.

Based on the information presented by UES and Staff's recommendation, we find this crossing necessary for UES to meet the reasonable requirements of reliable service to the public within UES's authorized franchise area and that the requested license may be exercised without substantially affecting the public rights in the waters of the Exeter River. We find that the crossing is for the public good and we 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, UES is authorized, pursuant to RSA 371:17 *et seq.*, to construct, maintain and operate electric lines over the Exeter River in Exeter described in its petition and depicted in its exhibits submitted March 16, 2007, and revised on May 1, 2007, and on file with this Commission; and it is

FURTHER ORDERED, that all construction and future reconstruction to this approved crossing shall conform to the requirements of the National Electric Safety Code and all other applicable safety standards in existence at that time; and it is

FURTHER ORDERED, that UES shall operate and maintain this crossing in accordance with the National Electric Safety Code; and it is

FURTHER ORDERED, that UES shall provide a copy of this order to the (i) Town Clerk of Exeter, (ii) New Hampshire Attorney General and the owners of the land bordering on said public waters at the location of the crossing, pursuant to RSA 371:19, and (iii) pursuant to RSA 422-B:13, New Hampshire Department of Transportation and the Office of Secretary, U.S.

Department of Commerce, by first class mail, no later than June 4 , 2007, and to be documented by affidavit filed with this office on or before June 18, 2007; and it is

FURTHER ORDERED, that UES 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 June 4, 2007 and to be documented by affidavit filed with this office on or before June 18, 2007; 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 June 11, 2007 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 June 18, 2007; and it is

FURTHER ORDERED, that this Order *Nisi* shall be effective June 25, 2007, unless UES 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 twenty-fifth day of May, 2007.

Thomas B. Getz Chairman	Graham J. Morrison Commissioner	Clifton C. Below Commissioner

Attested by:

Debra A. Howland
Executive Director & Secretary