

STATE OF NEW HAMPSHIRE

Inter-Department Communication

DATE: 15 October 2010

AT (OFFICE): NHPUC



FROM: Tom Frantz – Director, Electric Division

SUBJECT: DE 10-232: Petition by PSNH for a License to Construct and Maintain a Fiber Optic Line Cable over and across the public waters of Glenn Lake in the Town of Goffstown, New Hampshire

TO: Chairman Getz, Commissioners Below and Ignatius
Executive Director Howland

On September 3, 2010, Public Service Company of New Hampshire (PSNH) filed a petition with the Commission under RSA 371:17 for a license to construct and maintain a fiber optic line cable across Glenn Lake in Goffstown, New Hampshire. Based on comments received by PSNH from the consultant retained by Staff to review water crossings, PSNH filed a revised petition on September 30, 2010.

PSNH currently operates and maintains a 115 kV transmission line, designated the C-196 line, that runs between PSNH's Merrimack Substation located in Bow and its Gregg's Substation in Goffstown. The line crosses Glenn Lake with 3-phase wires and two static wires, one of which PSNH proposes to replace with an optical ground wire (OPGW). PSNH states that replacing the static wire with the OPGW cable will improve the reliability and capacity of its communications system.

Staff employed the Accion Group Inc.(Accion) to review PSNH's petition. Accion filed an electronic memo of its review of PSNH's petition with Staff on October 5. Accion stated that "...PSNH has provided sufficient information and data to justify construction of new electric lines across public waters at this location" and that "...PSNH assures the Commission that the new overhead facility will be properly constructed, operated, and maintained in accordance with the requirements of the NESC, ANSI C2-2007." Accion also stated 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." Accion further recommended to Staff that it recommend approval of PSNH's petition, but add a couple of conditions that it specified in the Accion report.

Based on the recommendation of Accion and Staff's review of the filing, Staff recommends that the Commission grant PSNH a license to replace the static wire with the OPGW cable over across Glenn Lake as recommended by Accion in its report. I have attached Accion's report to this memo. Please contact me if you have any questions or would like to discuss this matter.

**ACCION GROUP'S REVIEW
OF THE PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE'S
PETITION TO CROSS PUBLIC WATERS OF GLEN LAKE
IN THE TOWN OF GOFFSTOWN, NEW HAMPSHIRE**

October 5, 2010

REVIEW SUMMARY

On September 3, 2010, Public Service Company of New Hampshire (PSNH) filed a petition with the Commission (Petition) pursuant to RSA 371:17 for a license to replace an existing static wire on the C-196 115kV line between Merrimack Substation in Bow, New Hampshire and the Greggs Substation in Goffstown, New Hampshire with a static wire with fiber optic cable (known as an optical ground wire cable (OPGW)) over and across Glen Lake in Goffstown, New Hampshire. PSNH supplemented its filing on September 30, 2010. The crossing location is 0.15 miles west of the Glen Lake Dam and 0.1 miles north of New Hampshire Route 114. PSNH states that the C-196 115kV line is an integral part of the PSNH transmission system and the overall New England transmission grid, and that replacement of the existing static wire is required to improve and enhance the reliability and capacity of the communications system used in PSNH's electric system operations.

The C-196 115kV line was previously licensed by Commission Order No. 11,856, dated June 6, 1975, in Docket DE 75-106. PSNH states that the in-service date for this project is November 18, 2010, to take advantage of an outage of the C-196 115kV line from October 25, 2010 through November 18, 2010.

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); a construction detail drawing (PSNH Transmission Standard for a 115kV Type D Structure) (Figure 1); a construction detail drawing (PSNH Transmission Standard for 115kV Pole Top Details) (Figure 1A); and a construction detail drawing (PSNH Transmission Standard for a 115kV Dead End Structure Type DA for Angles Greater than 50 Degrees) (Figure 2). Figures 1, 1A, and 2 depict the construction specifications of the existing structures.

PSNH states that the new OPGW cable crossing will have an alignment exactly the same as the existing static wire crossing, as both existing structures will be used. PSNH further states that it owns permanent easements, not less than 375 feet wide, for its facilities on both sides of Glenn Lake. Additionally, PSNH states that no New Hampshire Department of Environmental Services permits are necessary for the construction of this crossing.

As designed by PSNH, the existing crossing consists of a Type D structure with two 110-foot wood poles (Structure #143) at the northerly side of the crossing, and a Type DA structure with three 85-foot wood poles (Structure #144) at the southerly side of the crossing, with a span of 1,180 feet between them. Both structures configure the conductors, static wire, and OPGW cable in a horizontal configuration.

As designed by PSNH, the Type D structure on the northerly side of the crossing (#143) places the phase wires with a spacing of 14.0 feet between them. The existing static wire and new OPGW cable are or will be mounted to the top of each pole with a 6 foot, 8 inch horizontal spacing and a 6 foot, 4 inch vertical spacing to the phase conductors. As designed, the Type DA structure on the southerly side of the crossing (#144) places the phase wires with a spacing of 14.0 feet between them. The existing static wire and new OPGW cable are or will be cross-arm mounted (centered on the phase conductors) with a 4 foot, 10 inch horizontal spacing and a 7 foot, 6 inch vertical spacing.

The new OPGW cable will be a 72-fiber conductor, tensioned to a maximum of 6,500 pounds, and sagged to National Electrical Safety Code (NESC) and 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 NESC expresses its clearance requirements in terms of distances above the 10-year flood level. PSNH determined that the 100-year flood level at Glen Lake is 275.0 feet above sea level using the elevations contained in the Flood Insurance Rate Map, Hillsboro County, Panel 0214D, Map Number 33011C0214D, with an effective date of September 25, 2009, issued by the Federal Emergency Management Agency, based on the North American Vertical Datum of 1988. 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 crossing according to Note 19 to Table 232-1 of the NESC and found that the surface area was 165.1+/- 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 25.5 feet for OPGW cables that meet Rule 230F.1.b. NESC Table 232-1.2 also requires the clearance to the land surface be 15.5 feet for OPGW cables that meet Rule 230F.1.b.

PSNH investigated a multitude of weather and loading conditions for its design. The conditions investigated included ANSI C2-2007 Heavy Load Conditions and various ambient temperatures and ice loading conditions. PSNH used these design conditions and combinations thereof to determine the minimum clearance of the OPGW to the water, land surfaces, and between the phase conductors and the OPGW.

As designed by PSNH, the maximum sag of the OPGW cable would occur when the OPGW cable is at 30 degrees F with one inch of radial ice. At this condition, PSNH calculates that at minimum clearance, the OPGW cable would remain 49.6 feet above the 100-year flood level of 275.0 feet and 71+/- feet above the land on the south side of the lake. In addition, the minimum distance requirement between the phase conductors and the OPGW cable, according to NESC Table 235-6-2a, is 57.3 inches (4.8 feet) when corrected for 115kV operation. PSNH calculates that the minimum distance between the phase conductors and OPGW cable is 3.0 feet vertically and 4 feet, 10 inches horizontally (5.7 feet) when the phase conductors are at 30 degrees F without ice, and the OPGW cable is at 30 degrees F with 1 inch of radial 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 in accordance with the requirements of the NESC, ANSI C2-2007 and will be maintained and operated in accordance with the NESC.

CONCLUSIONS AND RECOMMENDATIONS

Accion Group (Accion) reviewed the Petition and associated technical information filed by PSNH in support of its Petition.

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

Accion found that PSNH assures the Commission that the new overhead facility will be properly constructed in accordance with the requirements of the NESC, ANSI C2-2007, and will be maintained and operated in accordance with the NESC.

Accion 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 construction will be in accordance with the 2007 edition of the National Electrical Safety Code.

Accion recommends that Staff recommend approval of PSNH's Petition to the Commission.

Accion further recommends that Staff recommend the Commission include the following additional conditions in its order.

- Require that all future reconstruction to this approved crossing shall conform to the requirements of the National Electrical Safety Code and all other applicable safety standards in existence at that time.

- Require that PSNH maintains and operates this crossing in conformance with the National Electrical Safety Code.