NextEra Energy Transmission New York, Inc.

Marcy to Pleasant Valley Project

Exhibit 5

Design Drawings

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Figure

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*Figure contains Critical Infrastructure Information

EXHIBIT 5 – DESIGN DRAWINGS

This Exhibit addresses the requirements of 16 New York Codes, Rules and Regulations (NYCRR) Section 88.1 and the New York Public Service Commission's (Commission) orders in Case 12-T-0502 on April 22, 2013 and September 19, 2013.

5.1 Introduction

NextEra Energy Transmission New York, Inc. (NEETNY) proposes to construct and operate an approximately 148-mile 345-kilovolt (kV) single circuit alternating current (AC) transmission line paralleling existing transmission lines between the Marcy Substation in Oneida County and the Pleasant Valley Substation in Dutchess County (Marcy to Pleasant Valley Project or the Project) with an expected in-service date of September 2017.

5.2 Design Standards

The structures will be designed in accordance with applicable national and state codes and regulations and the Applicant's own standards. The most significant regulation is the National Electrical Safety Code (NESC). The NESC specifies both the minimum structural loads to determine the required structural capacity and minimum clearances to energized parts and wires, to ground, to adjacent transmission lines, to railroad lines, to buildings, and to a host of other facilities or objects.

NEETNY will design the Project to meet or exceed the requirements of the NESC. The six primary load conditions considered by NEETNY for this transmission line are:

1) **NESC Heavy Loading Grade B Construction, Rule 250B** which is the application of ½ inch radial ice and 4 pounds per square foot (psf) wind at a wire temperature of 0° Fahrenheit (°F).
2) **NESC Extreme Wind Loading, Rule 250C** which is the application of 90 miles per hour (mph) wind at a wire temperature of 60° F.
3) **NESC Extreme Ice with Concurrent Wind Loading, Rule 250D** which is the application of ¾ inch radial ice and 4 psf wind at a wire temperature of 15° F.
4) **Heavy Ice Loading** which is the application of 1 inch radial ice with no wind at a wire temperature of 32° F.

5) **Structure Deflection Loading** which is the application of 48 mph wind and a bare wire at a temperature of 60° F to define the deflection of the structure top and davit arms as appropriate.
6) **Local Seismic Loads** will be considered during design of the transmission line.

The wire in each load case is in the "initial" condition before the effects of creep or other loads influence the wire tension. The required electric line and equipment ratings will be in accordance to New York Power Pool Tie-line Ratings Report dated November 1995.

There will be several different structures and structure materials used for the 345-kV transmission line. In general, the line will be supported primarily with spun concrete pole structures with polymer braced post insulators. Monopole or galvanized steel lattice tower structures will be used at the dead-end locations. The Marcy to Pleasant Valley Project will be built with a two bundle 1590 ACSR 54/19 (Falcon) conductor and the shield wires will be an Optical Ground Wire (OPGW) SFPOC 4388 and a 7#7 AlumoWeld Overhead Ground Wire (OHGW). The material of construction, color, and finish are set forth in Exhibit E-1. Spun concrete monopole structures offer significant advantages over more conventional structure types and reduce the necessary time to build the transmission lines when compared to traditional lattice or steel structures. Spun concrete monopoles offer the following advantages: (1) high level of structural reliability; (2) reduced inspection/maintenance costs; (3) ease of installation; (4) small footprint, therefore using less right-of-way (ROW) land; and (5) reduced visual impact.

In previous projects involving NEETNY affiliates, affected landowners and other members of the public have expressed significant and consistent support for monopole-type structures due to their smaller size, more limited footprint, and reduced visual impact compared to traditional steel or lattice structures. Use of spun concrete monopole structures therefore, provides benefits to the community as compared with traditional structures.

NEETNY, through its affiliates Lone Star Transmission, LLC, and Florida Power & Light Company, has extensive experience in using spun concrete monopole structures, and is a leading industry innovator in their use. The use of spun concrete monopole structures will improve the cost-effectiveness, storm hardening, and efficiency of the Marcy to Pleasant Valley Project.

A detailed description of the proposed new transmission structures is included in Exhibit E-1, Description of Proposed Transmission Facilities, and will be included in the EM&CP.

Information on existing ROW and existing circuits provided in Exhibit 5 is based on data obtained from multiple sources, including Ventyx Transmission Data (2013), "Load & Capacity Data Report - Gold Book (NYISO, 2013), "Report on the Condition of Physical Elements of Transmission and Distribution Systems" (National Grid, 2012). All widths and ROW dimensions shown are approximate, based on current aerial imagery, county and municipal GIS parcel data, and field validation from public access crossings. Data were also verified by field reconnaissance from public access locations where possible.

Figures 5-1 through 5-8 are cross-section diagrams of the proposed transmission structures. Preliminary engineering indicates that the typical height of the structures will be approximately 95 feet above existing grade. Angle and corner poles will typically be up to 120 feet high and a few individual structures that are significantly taller will be required to maintain required clearances to existing transmission lines and other features. Figures 5-9 through 5-21 show the transmission corridor profiles of the ROW.