Project Proposal #3

Solution to Address Flowgates 15Y-T2/15Y-T3
(Mickleton-Monroe) and
15Y-S10 (Gloucester-Cuthbert)

PJM RTEP 2014/15 Long Term Proposal Window

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Executive Summary

PJM is seeking solution alternatives to resolve potential reliability criteria violations identified in the 15 year reliability analysis. PECO Energy Company is proposing a solution that would alleviate a subset of these problems, specifically identified as flowgates 15Y-T2, 15Y-T3 and 15Y-S10. Flowgates 15Y-T2 and 15Y-T3 are Mickleton-Monroe 230 kV lines #1 and #2, and are listed as overloaded by 2022 under the generator deliverability test for the tower outage of the Gloucester-Deptford and Gloucester-Eagle Point 230 kV lines. Flowgate 15Y-S10 is the Gloucester-Cuthbert 230 kV line #2, and is listed as overloaded by 2029 under the generator deliverability test for the outage of Gloucester-Cuthbert 230 kV line #1. To alleviate these issues, PECO proposes a project to build a new 230 kV line from Waneeta substation in Pennsylvania to Eagle Point substation in New Jersey. The estimated cost of the project is $81M in addition to land acquisition and permitting costs. The estimated time needed for construction of the required facilities is five years, with actual project completion time dependent on the time needed for land acquisition and permitting. Waneeta substation is located in the northern part of the city of Philadelphia and Eagle Point substation is located in Westville, New Jersey. Waneeta substation is surrounded by commercial/industrial businesses. Eagle Point substation is in an industrial area with open space nearby that could be acceptable for new transmission line right-of-way. The total length of the new line would be approximately 11 miles and construction would be all underground or submarine.

PECO Energy Company is requesting Designated Entity status for the project. PECO is an affiliate of Exelon Corporation. Exelon has submitted designated entity pre-qualification materials to PJM on behalf of its affiliates (PJM ID 13-04).

Company Evaluation

PECO Energy Company is headquartered in Philadelphia, PA. PECO is an affiliate of Exelon Corporation. Exelon's headquarters are located in Chicago, IL. For details regarding the qualifications, experience and financial standing of PECO Energy Company, please see the designated

entity pre-qualification materials submitted by Exelon on behalf of its affiliates (PJM ID 13-04). These materials are posted on PJM's website.

Proposed Project Constructability

1. Component Scope

    a. Greenfield Transmission Line Description

    The proposed project would include construction of a new 230 kV AC transmission line. The line would be built to connect Waneeta substation, located in the northern part of the city of Philadelphia, to Eagle Point substation, located in Westville, New Jersey. Waneeta is a PECO Energy substation and Eagle Point is a PSE&G substation. A potential route for the new line is shown on Diagram 1. [redacted] It is possible that a portion of the line could be aerial, but it is likely that most would need to be underground or submarine. Therefore, this proposal assumes all underground or submarine construction consisting of a single 5000 kcmil cable per phase. The estimated ratings of the new facility would be 765 MVA normal and 975 MVA emergency.

    The right-of-way for the new transmission line would need to be acquired. The portion of the line from Waneeta through the city of Philadelphia would be built under city streets. It is possible that the portion of the line from the southern part of Philadelphia to Eagle Point could be aerial. This area is sparsely populated and mainly industrial on both the Pennsylvania and New Jersey sides of the Delaware River. It is possible to cross the Delaware River aerially with towers constructed in the water. However, the length of the portion of the new line from southern Philadelphia to Eagle Point is a small portion of the total length. And although aerial construction would be preferred because it is less expensive and can allow for higher facility ratings, there is more potential for uncertainty regarding lead time and cost associated with a new aerial crossing of the Delaware River that requires towers built

in the water. Therefore, construction of the entire length of the new line is assumed to be all underground or submarine.

b. Greenfield Substation Description

The proposed new transmission line would connect two existing substations. Thus, a greenfield substation would not be needed.

c. Transmission Facilities to be Constructed by Others

The proposed new transmission line would connect to Waneeta substation, which is located in the northern part of the city of Philadelphia, [redacted] There is a 230 kV straight bus at the substation and the new line would connect to one section of the bus through a new circuit breaker. To reduce the risk of overloading the new line or nearby transmission facilities under certain circumstances, an inductor would be installed in series with the new line at Waneeta substation. PECO owns Waneeta substation, and thus would be responsible for installing the terminal equipment needed to attach the new line to the existing bus. A single line diagram of the proposed connection at Waneeta substation is shown in Diagram 2.

The other end of the new line would connect to Eagle Point substation, which is located [redacted] in Westville, New Jersey. Eagle Point is a PSE&G substation [redacted]. To accommodate connection of the new line, the existing straight bus would need to be expanded into a ring bus and two circuit breakers would need to be added to create a new line position. A single line diagram of the proposed connection at Eagle Point substation is shown in Diagram 3.

d. Environmental, Permitting and Land Acquisition

PECO Energy Company will consult with all applicable regulatory agencies as required when constructing new transmission facilities. PECO will ensure that necessary documentation is supplied and procedures are followed throughout the duration of the project. This would include

studies and permitting for constructability and construction methods, site access and equipment staging, river crossing, environmental impacts, and development of mitigation plans to address any impacts if determined to be necessary. Specific environmental studies will be needed to identify the presence of wetlands and any endangered plant, fish or animal species. Any construction that impacts wetlands would require a permit from the U.S. Army Corps of Engineers and possibly the U.S. Coast Guard.

The proposed project would require the acquisition of right-of-way on which to construct the new transmission line. A significant portion of the line would be built underground from north to south through the city of Philadelphia. It is possible that the remaining portion could be aerial. However, it is likely that aerial construction over the Delaware River would require towers in the water, due to the width of the river in the area of the crossing. This could add permitting lead time and cost to the project estimates. Therefore, construction of the new line is assumed to be all underground and submarine.

[redacted]

Diagram 1

(potential route for new line)

[redacted]

Diagram 2

(connection of new line at Waneeta substation)

[redacted]

Diagram 3

(connection of new line at Eagle Point substation)

2. Project Component Cost Estimates

An itemized cost estimate for the proposed project is as follows:

Build new 230 kV transmission line	
Install series inductor at Waneeta substation	
Attach new line to Waneeta substation	
Expand 230 kV at Eagle Pt. substation to ring bus	
Attach new line to Eagle Pt. substation	
Total	$81M

The new transmission line would be a total of 11 miles in length, all underground or submarine construction, with a single 5000 kcmil conductor per phase. The ratings of the new line would be 765 MVA normal and 975 MVA emergency. The new transmission line would be attached at Waneeta substation to a section of the existing straight bus through a new circuit breaker. A current limiting inductor would also be installed at Waneeta in series with the new line. The other end of the new transmission line would be attached at Eagle Point substation. The 230 kV bus at Eagle Point would need to be reconfigured into a ring bus with two additional circuit breakers.

The estimate includes engineering and design, material and labor. The cost of land acquisition and permitting for the new transmission line is not included.

3. Schedule

The proposed project would include construction of a new 230 kV transmission line connecting Waneeta substation in Pennsylvania to Eagle Point substation in New Jersey. An estimate for the time required to construct the transmission line is five years. The proposed project would also include the addition of a series inductor at Waneeta substation and work required to connect the new line to both Waneeta and Eagle Point substations. It is anticipated that this work would be done concurrently with construction of the new transmission line. Therefore, an estimate for the total time required to construct the facilities included in the proposed project is five years. This includes engineering and design, but does not include the time required for land acquisition and permitting. However, it is expected that much of

the work associated with land acquisition and permitting would be done in parallel with the engineering and design work.

4. On-going Transmission Facility Items

    a. Operational Plan

    PECO Energy Company is a registered member of Reliability First Corporation and a transmission owner within the PJM Regional Transmission Organization. PECO operates a control center within its territory 24/7 with system operators who maintain both PJM and NERC certification. A state-of-the-art Energy Management System provides SCADA control and monitoring of all of PECO's transmission facilities. PECO also maintains a fully functional back-up control center in the event the primary location must be evacuated.

    b. Maintenance Plan

    PECO Energy Company owns and maintains over 1,100 miles of transmission lines and over 90 transmission substations throughout its territory. Maintenance on these facilities is performed by both experienced in-house crews and experienced contract crews operating under the direction of in-house personnel. PECO implements a comprehensive preventive maintenance program that meets all regulatory and industry standards. This includes a maintenance template for all transmission facilities that documents necessary program tasks and frequencies. PECO has in-house equipment and personnel and also maintains relationships with outside vendors and other utilities to enable quick restoration in the event of an outage.

5. Assumptions

The proposed project includes the construction of a new 230 kV transmission line, installation of a series inductor and work at either end of the new line to connect into existing substations. The estimates provided for cost and construction time are based on generic facilities and typical projects. However, each project is unique and actual cost and construction times may vary from the estimates. In addition, land

acquisition and permitting have not been included in the estimates, but much of this work would be performed in parallel with the engineering and design work.

Although Diagram 1 shows a potential route for the new transmission line, there may be other routes that could be chosen as alternatives. Final determination of a route can be made after the proposed project is selected as a solution to the identified problems.