



An Exelon Company

Project Proposal #1

Solution to Address High Voltages at Light Load on
230 kV buses at Mercer, Kuser and Trenton

PJM RTEP – 2014 Project Proposal Window #2

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Executive Summary

PJM is seeking solution alternatives to resolve potential light load reliability criteria violations identified as part of the 2014 RTEP study. PECO Energy Company is proposing a solution that would alleviate a subset of these problems, specifically identified as flowgates LL-V6 to LL-V13 for the L_A-2201 contingency event. These are high voltages on the 230 kV buses at Mercer, Kuser and Trenton caused by an outage of the Mercer-Kuser-Lawrence 230 kV line. [REDACTED] The area surrounding the proposed site of the new substation and transmission line is sparsely populated, mainly industrial, with significant amounts of undeveloped land. In addition, several transmission facilities are already located in the area that may be upgraded or reconfigured to accommodate a new line. Thus, there are multiple alternatives for siting the new substation and routing the new transmission line.

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. [REDACTED] The line would be aerial with a total length of approximately [REDACTED] miles and consist of lattice or pole type structures carrying 1590 kcmil ACSR conductor. The estimated ratings of the new facility would be 731 MVA normal and 885 MVA emergency.

The right-of-way for the new transmission line would need to be acquired. However, there are multiple potential routes for the new line [REDACTED] The area is sparsely populated, mainly industrial, with significant amounts of open space. There are several existing transmission facilities throughout the area operated at 230 kV, 138 kV and 69 kV voltage levels. Some are part of the regional transmission network, but others serve local industrial load or connect generating plants to substations located outside the local area. There are two transmission lines [REDACTED]. PECO has ownership or partial ownership of many of these facilities. It is possible that some of these existing facilities may be able to be upgraded or reconfigured to achieve the same connection [REDACTED] This could reduce the amount of right-of-way required to implement the project.

b. Greenfield Substation Description

The proposed project would include construction of a new 230 kV switching station. [REDACTED] The new switching station would include a ring bus with three circuit breakers creating three separate bus positions. [REDACTED] would be cut near the location of the new substation and each end would be connected to a separate position on the ring bus. A new transmission line would be built connecting the third position on the ring bus [REDACTED] A single line diagram of the proposed connection of the new transmission line and either [REDACTED] at the new substation is shown in diagram 2.

The property on which to build the new substation would need to be acquired. However, [REDACTED] is mainly industrial and there is a significant amount of undeveloped land. There

are multiple generating plants in addition to industrial facilities operating in the area.

c. Transmission Facilities to be Constructed by Others

The proposed new transmission line would connect to an existing 230 kV ring bus [REDACTED] There are generating units as well as 230 kV transmission lines presently connected at the substation. The proposed new transmission line would be connected to the ring bus [REDACTED] through a new circuit breaker that would be installed at the substation. Alternatively, it may be preferable to add the circuit breaker directly to the bus, creating an additional bus section for the new line to be connected. A single line diagram of the proposed connection at [REDACTED] 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 a site on which to construct a new switching station and right-of-way on which to construct the new transmission line. However, the area in which the property would need to be acquired is mainly industrial and has significant amounts of undeveloped land. Further, the new line would [REDACTED] In addition, it is possible that existing facilities in the area, many of which are

owned by PECO, could be used to complete a portion of the line. This could reduce the right-of-way requirements needed to implement the project.

Diagram 1

Diagram 2

Diagram 3

2. Project Component Cost Estimates

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

Build new 230 kV substation	\$[REDACTED]
Attach [REDACTED] to new substation	\$[REDACTED]
Build new 230 kV transmission line	\$[REDACTED]
Attach new transmission line to new substation	\$[REDACTED]
Attach new transmission line [REDACTED]	\$[REDACTED]
Total	\$[REDACTED]

The new substation includes a ring bus with three circuit breakers. The new transmission line would be a single circuit on either pole or lattice type structures. The length of the line would be approximately [REDACTED] miles and the conductor would be 1590 kcmil ACSR type with ratings of 731 MVA normal and 885 MVA emergency. The new transmission line would be attached to the 230 kV ring bus [REDACTED] through a new circuit breaker.

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

3. Schedule

The proposed project would include construction of a new 230 kV switching station with a three circuit breaker ring bus. An estimate for the time required to construct the switching station is [REDACTED] The proposed project would also include construction of a new 230 kV transmission line connecting the new switching station [REDACTED] The proposed project would also include work necessary to connect the new transmission line to the new switching station and [REDACTED], as well as work necessary to cut and tie the [REDACTED] into the new substation. It is estimated that this work would be done concurrently with construction of the new switching station and new line. Therefore, an estimate for the total time required to construct the facilities included in the proposed project [REDACTED] This includes engineering and design, but does not include the time required for land acquisition and permitting.

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 a new 230 kV transmission switching station and a new 230 kV transmission line. 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. Although diagram 1 shows one potential site for the new switching station and one potential route for the new transmission line, there are other potential sites and routes that could be chosen as alternatives. In addition, it may be possible to convert some existing facilities owned or partially owned by PECO that are presently operated at 138 kV to 230 kV operation for the purpose of completing the transmission line. It may also be possible to extend and upgrade [REDACTED] Final determination of a site and route for the new facilities can be made after the proposed project is selected as a solution to the identified problems. However, it may be possible to reduce the lead time and costs required for land acquisition and permitting typically associated with building a new substation and transmission line.