



17 North Second Street
12th Floor
Harrisburg, PA 17101-1601
717-731-1970 Main
717-731-1985 Main Fax
www.postschell.com

Jessica R. Rogers

jrogers@postschell.com
202-661-6964 Direct
202-661-6944 Direct Fax
File #: 178012

December 2, 2019

VIA ELECTRONIC FILING


Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

**Re: Letter of Notification of PPL Electric Utilities Corporation, Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G, for Approval of the Glen Brook Substation 230 kV Connecting Lines Project in Salem Township, Luzerne County, PA
Docket No. A-2019-3012304**

Dear Secretary Chiavetta:

Enclosed for filing are the responses of PPL Electric Utilities Corporation to the Bureau of Technical Utility Services Data Requests Nos. A-34 through A-37 and A-39, in the above-referenced proceeding.

Respectfully submitted,


Jessica R. Rogers

JRR/jl
Enclosures

cc: Jordan Van Order (via E-mail)

WITNESS: David A. Quier

PPL Electric Utilities Corporation
Response to Data Requests of
Bureau of Technical Utility Services
Dated December 2, 2019
Docket No. A-2019-3012304

A-34

Reference the Letter of Notification, Attachment 1. Section 3.3. Please explain whether a 230 kV bus-tie circuit breaker failure has occurred, in the previous 5 years, at the Columbia Substation. If so, for each event, please provide the date, duration of the event, and whether any voltage drops exceeded 8%.

Answer

There were no instances of a breaker failure for the 230 kV tie breaker at the Columbia Substation in the last five years.

WITNESS: David A. Quier

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A-35

Reference the Letter of Notification, Paragraphs 17 and 18. Please state the approximate duration of an outage associated with each of the three scenarios.

Answer

In either of the 230 kV or 69 kV bus-tie circuit breaker failure contingencies the approximate duration of an outage would be approximately 15 minutes and 2 hours respectively. The discrepancy in outage times is a result of the 230 kV bus-tie circuit breakers being able to be switched remotely, while the 69 kV breaker requires a crew to be dispatched and switched manually if necessary. Both situations would immediately cause low voltage on the 69 kV system that may cause significant damage to customers equipment across the 69 kV system in the Berwick area. The low voltage and voltage drop violations occur because these three substations are networked together on the 69 kV system and when the Columbia Substation source is lost, the customers in the area are served from the other two substations through long 69 kV line paths. These customers experience low voltage and an excessive voltage drop due to the high impedance of the long 69 kV lines. Adding a new 230/69 kV connection in the area will greatly reduce the distance and thus the impedance between the area's 230 kV sources and the load.

In the event of a double circuit fault on the Susquehanna-Harwood #1 & #2 230 kV lines the approximate duration of an outage would be approximately 15 minutes. This outage estimate is based on the estimated time it would take to coordinate with PJM to adjust generator dispatch to temporarily resolve the thermal violation. The thermal overload as result of this contingency may damage or significantly reduce the life of the Hunlock-Berwick 69 kV line. The Susquehanna-Harwood #1 & #2 230 kV lines transport power between the Susquehanna and Harwood substations. When these 230 kV lines are out of service the 69 kV networked system provides the only direct path for power to flow from Susquehanna to Harwood. For loss of the 230 kV double circuit tower line, power can flow from Susquehanna to Mountain Substation on the 230 kV system and then through the 69 kV system from Mountain to Hunlock to Berwick and then on to Harwood. This is the cause of the thermal violation on the Hunlock – Berwick 69 kV line. The thermal violation will be mitigated by the upgrade because the proposed project will allow the power system in the area to be taken out of its current networked configuration. This will prevent power from flowing directly from Hunlock substation to Harwood Substation as there will be open points on the 69 kV system.

Note that outage duration for the above three scenarios is based on best case scenario assumptions that appropriate switching operations and generation redispatch can be performed within the above mentioned time frames. If switching or generation

redispatch does not occur in those time frames the risk of customer equipment damage and system damage increases. After the occurrence of the contingency it will take approximately 24-48 hours to replace failed equipment depending upon the extent of the damage and availability of the equipment. PPL EU's system is vulnerable to suffering additional damage if there is another component failure on the grid during the time that the repairs are being made.

WITNESS: David A. Quier

PPL Electric Utilities Corporation
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A-36 Reference TUS Data Requests, Response to A-18. The contingency scenarios described appear to be NERC TPL-001-4, P2-4 and P7. Contingency scenario P2-4 is not included in the PPL EU Planning Process, Methodology and Criteria, Table 3-1. Please explain.

Answer The contingency scenarios described in the LON do not include NERC TPL-001-4, P2-4.

The scenarios described are NERC TPL-001-4, P4 and P7 contingencies. Contingency Events P4-2, P4-3, P4-5, and P4-6 are applicable to the Columbia 230 kV bus-tie circuit breaker. Contingency Events P4-2, P4-3, P4-4, P4-5, and P4-6 are applicable to the Columbia 69 kV bus-tie circuit breaker. These P4 contingencies are included in PPL EU's Criteria.

WITNESS: David A. Quier

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A-37

Reference TUS Data Requests, Response to A-22. Please explain how the three scenarios would be addressed if either occurred prior to completion of the proposed project.

Answer

There are no temporary solutions in place or planned to address the violations if these scenarios would occur prior to the completion of the proposed project.

The PPL EU transmission system is at the risk of having thermal or voltage violations if any one of the three contingency events described in the LON would occur prior to the completion of the project. The thermal overload may lead to failure of the Hunlock-Berwick 69 kV line and voltage violations may cause severe damage to customer equipment.

WITNESS: David A. Quier

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A-39

Reference TUS Data Requests, Responses to A-6 & A-7. Please provide a history of 230 kV double circuit tower structure failures and 230 kV and 69 kV bus-tie circuit breaker failures for a minimum of the previous 5 years across the PPL Electric transmission system.

Answer

There were no 230 kV double circuit tower structure failures on the PPL EU system in the last 5 years. There were no 230 kV or 69 kV bus-tie circuit breaker failures on the PPL EU system in the last 5 years, however there were 13 circuit breaker failures on the PPL EU system in the last 5 years among all voltage classes and all circuit breaker positions. Since risk of breaker failure is independent of breaker position or voltage class, these numbers have been provided for reference.

VERIFICATION

I, DAVID A. QUIER being the DIRECTOR OF ASSET MANAGEMENT at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 11/27/2019