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File #: 166392

July 10, 2018

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 for Approval to Rebuild the Existing Breinigsville-Alburtis 500 kV Transmission Line in Lehigh County, Pennsylvania - Docket No. A-2017-2635709

Dear Secretary Chiavetta:

Enclosed for filing are the Responses of PPL Electric Utilities Corporation to the Data Requests of the Bureau of Technical Utility Services in the above-referenced proceeding.

Respectfully submitted,

Lindsay A. Berkstresser

LAB/jl
Enclosures

cc: Jordan Van Order (*Via E-mail*)

PPL Electric Utilities Corporation
Response to the Data Requests of
The Bureau of Technical Utility Services
Dated June 7, 2018
Docket No. A-2017-2635709

Q.9 Reference the file "BREI-ALBU 500 Timeline FINAL" (email received 5/10/2018), NERC Standard versus PPL TO Criteria. Please explain the first paragraph.

A.9 This NERC standard requires Transmission Planners (PJM) and Transmission Owners (PPL Electric) to develop operational criteria to ensure the reliable operation of the transmission system. These operational criteria are transmission system-specific because each utility's system is unique. As a result, each Transmission Owner is responsible for identifying its own operating criteria for its system, including acceptable voltage levels for the transmission system. These values, which are also called TO Criteria, are reported to FERC annually on FERC Form 715.

When developing acceptable voltage levels for the transmission system, PPL Electric determined the required voltage necessary on the transmission system to maintain the required voltage on the distribution system, which is based on the voltage range for distribution customers set forth in the PUC's regulations.[1]

The voltage on the transmission system has a direct correlation to the distribution system as voltage deviations on the transmission system are cascaded down with impacts to customers on the distribution system.

As noted above, the PUC sets requirements for an acceptable voltage range, as well as voltage deviation, in its regulations. PPL Electric used this voltage to determine the acceptable corresponding transmission voltage drop (8%) allowable on the 138 kV transmission system. In other words, voltage drops larger than 8% would result in voltages on the distribution system below the PUC's acceptable

[1] 52 Pa. Code § 57.14.

(b) *Allowable voltage variation (primarily lighting).* For service rendered primarily for lighting purposes, the allowable variation in voltage measured at the service terminals of the customer may not exceed, for a longer period than 1 minute in each instance, 5% above or below the standard nominal service voltage and a total variation from minimum to maximum of 8% during normal system operation.

range. As a result of the N-1-1 criteria described in the LON, the corresponding voltage drop on the transmission system is 13%. Thus, the voltage range in the PPL Electric transmission criteria is set to ensure that PPL Electric distribution customers have acceptable voltage as defined by the Commission.

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Q.10 Reference the File ALBU_BREI Diagram 1 (Email Received 5/16/2018). Please explain whether the operational maneuver performed under the current configuration would be an acceptable solution to the NERC violation if it were to remain in place and the system design was not changed to the final configuration.

A.10 The operational maneuver is not an acceptable solution because it does not resolve the violation, which would be a low voltage and voltage drop condition. An operational maneuver is a reactionary approach that would be employed after the low voltage violation occurs. In other words, the operational maneuver does not prevent the low voltage conditions from occurring on the system, it therefore does not address the low voltage violation. The only acceptable measure to address the low voltage violation is through a planning solution which removes the risk from the transmission system prior to it occurring.

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Q.11 Reference the File ALBU_BREI Diagram 1 (Email Received 5/16/2018). Please explain whether load drop is ever an acceptable solution to a NERC violation.

A.11 An operational action such as load drop is not an acceptable solution because it does not prevent the criteria violation from occurring. Load drop will result in black out conditions to a significant number of customers for an extended period of time.

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Q.12 Reference the Letter of Notification, Section II(B) "Proposed Project". If, hypothetically, the subject LON was not approved, please explain how PPL would address the NERC violation.

A.12 Because this project is necessary to address a potential low voltage violation, PPL Electric would pursue all available options to see this project to completion.

PPL Electric Utilities Corporation
Response to the Data Requests of
The Bureau of Technical Utility Services
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PUC Question

Reference the email sent May 16, 2018. If PPL Electric were to drop the load served by the Breinigsville Substation, please state the type of customers which would be dropped.

PPL Response

The Breinigsville substation primarily feeds industrial load customers on the transmission and distribution systems but there are also residential customers sourced from this substation.

PPL Electric Utilities Corporation
Response to the Data Requests of
The Bureau of Technical Utility Services
Dated June 21, 2018

PUC Question

Reference the email sent May 16, 2018. Please explain whether any of the 10,000 customers which would be dropped under the described scenario are critical customers. If so, please explain the type.

PPL Response

PPL defines a critical customer as certain hospitals, 911 call centers, wastewater treatment plants, prisons or other vital facilities. Based on this definition, there are no critical customers among the 10,000 that would be dropped. However, the 10,000 customers include a significant number of large-scale industrial customers including Air Products, Tek Park, Amazon, Nestle foods, and Coca Cola bottling. Additionally, there are numerous communication facilities, county and township offices, healthcare facilities, schools, sewage treatment facilities (non-critical), and UGI gas facilities.

PPL Electric Utilities Corporation
Response to the Data Requests of
The Bureau of Technical Utility Services
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PUC Question

If the N-1-1 scenario were to occur and PPL were to drop load. Please provide the approximate duration of the outage and provide the approximate economic impact.

PPL Response

The duration of the load drop would be dependent on the cause for the 500kV outage and the severity of the damage to the line. The load could not be picked up until all repairs are complete. For a 500kV outage, the time to restore the line could range from ten hours to three days or more depending on the cause and timing of the event. PPL EU does not quantify the economic impact of outages.

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Dated June 21, 2018

PUC Question

Reference TPL-001-4, Page 9. Category P6 appears to describe the subject N-1-1 scenario and states that non-consequential load loss is allowed. The response to data request A-11 indicates that load drop is never an acceptable solution. Please explain.

PPL Response

The objective of the referenced NERC standard is to ensure the reliability of the regional bulk power grid. From a regional bulk power perspective it is acceptable to allow load loss (non-consequential) in order to preserve the reliability of the regional bulk power grid. In this case, in order to prevent the voltage violation from actually occurring, PPL would have to drop the Breinigsville substation after the first contingency event to prevent the low voltage condition on the system if the second contingency event were to occur. PPL does not find this to be acceptable practice because the 10,000 customers would have to be dropped prior to the second contingency occurring to prevent the violation. The operating sequence to address this situation is provided below. During peak load conditions neither of the two 500kV lines could be taken out of service for emergency maintenance or repairs without dropping the Breinigsville substation.

Additionally, it should be noted that the NERC standard requires that PPL, through proper design of its transmission system, remove the possibility that the subject event (unacceptable voltage conditions) occur. If PPL allowed its transmission system to get to the point where it is possible the subject event could occur, that in itself constitutes the violation. In other words, an actual voltage event does not have to occur for there to be a violation, a violation occurs because PPL has allowed the possibility of the event occurring to exist on its system.

Operating sequence:

1. 500kV line out of service

2. Remove the Breinigsville substation from service, causing a black out for 10,000 customers (If these customers were not dropped and the second 500kV line trips PPL would experience a low voltage and voltage drop violation. As such, PPL must proactively remove the Breinigsville substation from service.)

3. Second 500kV line trips.

4. 500kV lines repaired and returned to service.

5. Breinigsville substation restored and power to 10,000 customers is restored.

VERIFICATION

I, PHIL O. PENNY, being the MANAGER - TRANSMISSION PLANNING 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: 6/8/18