COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF KENTUCKY POWER COMPANY FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO PERFORM UPGRADE, REPLACEMENT, AND INSTALLATION WORK AT ITS EXISTING SUBSTATION FACILITIES IN PERRY AND LESLIE COUNTIES, KENTUCKY	)))))))	CASE NO. 2019-00154

O R D E R

On June 27, 2019, Kentucky Power filed an application, pursuant to KRS 278.020(2) and 807 KAR 5:001, Section 15, requesting a Certificate of Public Convenience and Necessity for authorization to perform upgrade, replacement, and installation work in connection with facilities and equipment at the company's Hazard and Wooton Substations. Kentucky Power states that the transmission project would bring the two substations into conformity with current design and safety specifications, replace failing and aging equipment, and facilitate the implementation of the baseline projects that were approved in Case No. 2017-00328.[1] The estimated total cost of the transmission project is approximately $25.3 million.

Pursuant to the Commission's Order of September 3, 2019, a procedural schedule was established for the orderly processing of this matter. The procedural schedule provided for a deadline to request intervention, two rounds of discovery upon Kentucky

[1] Case No. 2017-00328, *Electronic Application of Kentucky Power Company for a Certificate for Public Convenience and Necessity to Construct a 161 KV Transmission Line in Perry and Leslie Counties, Kentucky and Associated Facilities* (Ky. PSC March 16, 2018).

Power's application, an opportunity for the filing of intervenor testimony, discovery upon intervenor testimony, and an opportunity for Kentucky Power to file rebuttal testimony. The only intervenor in this matter is the Attorney General of the Commonwealth of Kentucky, by and through the Office of Rate Intervention (Attorney General). At the request of Kentucky Power, an informal conference was scheduled on July 30, 2019, at the Hazard Substation. The purpose of the informal conference was to allow Commission Staff and the Attorney General to view the Hazard and Wooton Substations and its condition, along with many of the elements that are the subject of Kentucky Power's application in this proceeding.[2] The informal conference also allowed Commission Staff and the Attorney General to ask questions about the proposed work.[3] Kentucky Power also filed responses to two rounds of discovery requests from Commission Staff and the Attorney General. A formal hearing was held on February 4, 2020. Kentucky Power filed responses to post-hearing data requests on February 21, 2020. Kentucky Power filed its post-hearing brief and reply brief on March 6, 2020, and April 2, 2020, respectively. The Attorney General filed its post-hearing brief on March 20, 2020. The matter now stands submitted for a decision.

BACKGROUND

Kentucky Power states that the Hazard Substation was constructed in the early 1940s and sits on a two acre site that is constrained by existing development and the Kentucky River. There are six transmission and three distribution circuits that terminate

[2] Informal Conference Memo, filed August 28, 2019.

[3] *Id.*

at the Hazard Substation. The six transmission circuits that terminate at the Hazard Substation are as follows:

- Hazard – Wooton 161 kV
- Hazard – Beckham 138 kV
- Hazard – Bonnyman 69 kV #1
- Hazard – Bonnyman 69 kV #2
- Hazard – Leslie 69 kV
- Hazard – Daisy 69 kV

The three distribution circuits that terminate at the Hazard Substation are (1) Hazard – Blackgold 34.5 kV, (2) Hazard – Hazard 12 kV, and (3) Hazard – Kenmont 34.5 kV. The three distribution circuits serve approximately 1,800 customers and 30 MW of load.

According to Kentucky Power, the Wooton Substation was constructed in 2006 and is located on a one-half acre site in northeaster Leslie County, Kentucky. There are three transmission circuits that terminate at the Wooton Substation, with no distribution circuits that terminate at the substation. The three transmission circuits that terminate at the Wooton Substation are (1) Hazard – Wooton 161 kV, (2) Leslie – Wooton 161 kV, and (3) Arnold/Delvinta (LG&E) – Wooton 161 kV.

Kentucky Power states that it was granted a CPCN in Case No. 2017-00328 to rebuild the 6.5-mile Hazard – Wooton 161 kV transmission line that terminates at both the Hazard and Wooton Substations and the replacement of a 161/138 kV single-phase transformer at the Hazard Substation with a new 161/138 kV three-phase transformer. Kentucky Power further states that it was also ultimately granted a CPCN in Case No. 2017-00328 to reconfigure the Hazard – Jackson 69 kV transmission line. Kentucky

Power notes that the Hazard – Wooton 161 kV transmission line and the new 161/138 kV three phase transformer were approved by PJM Interconnection, LLC (PJM) as Baseline Projects. The reconfiguration of the Hazard – Jackson 69 kV transmission was determined in Case No. 2017-00328 to be required to implement the Baseline Projects. Kentucky Power had also sought CPCN authorization to perform certain upgrades to the Hazard and Wooton Substations in Case No. 2017-00328 that were classified as Supplemental Projects at PJM.[4] Kentucky Power was denied without prejudice a CPCN for these Supplemental Projects because Kentucky Power failed to establish a need for these upgrades and due to a ruling in a Federal Energy Regulatory Commission (FERC) matter in which FERC found issues of transparency in connection with PJM's stakeholder process for Supplemental Projects and required PJM to make changes to such stakeholder process to provide for more transparency for Supplemental Projects.

The projects proposed in the instant matter consist of 20 upgrade, improvement, and replacement components at the Hazard Substation and 3 upgrade, improvement, and replacement components at the Wooton Substation. The Hazard Substation projects include the following: (1) the replacement and relocation of the 161 kV circuit breaker, designated as Circuit Breaker M, and associated line relaying pointing towards the Wooton Substation; (2) installation of a low side 138 kV circuit breaker and upgrade relaying on the new 161/138 kV three-phase transformer; (3) installation of a new three-phase 161/138 kV spare transformer; (4) new circuit breakers and circuit switchers as well as ancillary equipment to segment to sectionalize the substation into separate protection zones; (5) installation of a 69 kV circuit breaker connecting the 69 kV Bus #1

[4] Case No. 2012-000378, final Order at 2–3 (five upgrades to the Wooton Substation and 46 upgrades to the Hazard Substation).

and Bus #2; (6) replacing and upgrading station platforms and decks to conform to current safety, clearance, or structural standards; (7) replacing aging and outdated elements or components that are suffering from corrosion, damage, leaks, and other malfunctions; and (8) replacing electromechanical and static relays that are no long supported by manufacturers with current standard microprocessor based relays and controls.[5]

The Wooton Substation projects include the following: (1) installing surge arrestors on the 161 kV box bay structure on the Hazard Line position; (2) installing telecommunication fiber equipment for remote monitoring and operation of equipment; (3) installing two coupling capacitor voltage transformers (CCVT) on Phase 2 and Phase 3 of the existing 161 kV bus to meet industry accepted protection and control standard.[6] The specific project elements the Hazard Substation and the Wooton Substation are provided in Exhibit 2 of the application, which exhibit is attached hereto as Attachment 1.

Kentucky Power identified nine project elements that had been classified as Supplemental Projects at PJM during Case No. 2017-00378, but have subsequently been reclassified Baseline Projects.[7] Those projects are as follows:[8]

Hazard Substation

1. Replacement of Circuit Breaker M.
2. Replacement of line protection and circuit breaker control associated with the 161 kV Wooton line protection.
3. Installation of a 138 kV circuit breaker with relay control on the low side of the 161/138 kV three phase transformer.
4. Replacement of devices for transmission transformer protection associated with the 161/138 kV three phase transformer.
5. Replacement of CCVT on the 138 kV Bus #2.
6. Replacement of devices for the 138 kV Bus #2 protection.

[5] Direct Testimony of Kamran Ali (Ali Testimony) at 3–4.

[6] Ali Testimony at 4.

[7] Kentucky Power's response to Commission Staff's Initial Request for Information, Item 2.

[8] *Id.*

Wooton Substation

1. Installation of station class surge arresters.
2. Installation of two CCVTs on Phase 2 and Phase 3 of the 161 kV Bus.
3. Installation of telecommunication fiber equipment.

Kentucky Power notes that PJM in 2018 revised its transmission planning process for Supplemental Projects.[9] Addressing FERC's concerns regarding coordination and transparency, PJM included the following protocols in its transmission planning process for Supplemental Projects:

- Provide for separate stakeholder meetings to discuss: 1) models, criteria, and assumptions used to plan Supplemental Projects (Assumptions Meeting); 2) needs underlying Supplemental Projects (Needs Meeting); and 3) proposed solutions to meet those needs (Solutions Meeting).

- Post models, criteria and assumptions at least 20 calendar days prior to the Assumptions Meeting.

- Post criteria violations and drivers at least 10 days in advance of the Needs Meeting.

- Post potential solutions and alternatives identified by the PJM Transmission Owners or stakeholders at least 10 days in advance of the Solutions Meeting.

- Submit comments at least 10 days before the Local Plan is integrated into the Regional Transmission Expansion Plan (RTEP) for PJM Transmission Owner review and consideration.

Kentucky Power states that PJM's RTEP process is a 24-month planning process that identifies reliability issues over a 15-year horizon and is guided by planning criteria established by PJM, the North American Electric Reliability Corporation, ReliabilityFirst Corporation, and American Electric Power (AEP).[10] The RTEP process generally results in two categories of projects, Baseline and Supplemental.[11] Baseline Projects are those

[9] Ali Testimony at 7.

[10] Ali Testimony at 6.

transmission expansions or enhancements that are needed to comply with PJM's system reliability, operational performance, or market efficiency criteria, as well as projects that are needed to meet Transmission Owners' local transmission planning criteria.[12] Supplemental projects are all projects that do not address minimum bright-line transmission planning criteria, but are needed to maintain the existing grid, connect new customers, satisfy contractual and regulatory requirements, and to meet Regional Transmission Organization (RTO) and industry standards.[13] Kentucky Power maintains that it follows established and detailed internal-AEP protocol to evaluate and select Supplemental Projects that assures only projects that are needed are pursued.[14] Among the factors that are considered in evaluating transmission system needs are safety risks or concerns, asset condition, abnormal operating conditions, reliability performance, RTO notices, stakeholder and customer input, and state and federal standards or policies.[15] Kentucky Power points out that it selects those Supplemental Projects that are needed to maintain the reliability of its transmission grid within the AEP Zone.[16] Kentucky Power further states that the criteria for designation as a Supplemental or Baseline Project are not mutually exclusive, and a single project sometimes can be justified under either.[17]

[11] *Id.*

[12] *Id.*

[13] *Id.*

[14] Ali Testimony at 8.

[15] Ali Testimony at 8–9.

[16] Ali Testimony at 8.

[17] Ali Testimony at 10.

Kentucky Power informs that all of the proposed projects were reviewed under PJM's new stakeholder RTEP process. Kentucky Power notes that the designation of a project as a Baseline or Supplemental Project is not indicative of the level of, or absence of, need for the project.[18] Rather the designations reflect that the project satisfies different planning requirements and parameters.[19] Kentucky Power notes that both Baseline and Supplemental Projects are required for the company to satisfy its service obligations under KRS 278.030(3). Kentucky Power contends, however, that KRS 278.020(1) does not distinguish between Baseline and Supplemental Projects, but only requires a demonstration of a need for the proposed construction and absence of wasteful duplication to be authorized a CPCN for the proposed projects.

Kentucky Power asserts that it has established that the proposed transmission projects for the Hazard and Wooton Substation are required to implement the Baseline Projects previously approved in Case No. 2017-00328 or needed to replace and upgrade aging, deteriorating, and obsolete equipment. Kentucky Power further asserts that the proposed transmission projects would not result in wasteful duplication of facilities in that, according to Kentucky Power, the projects represent a cost-effective alternative to address the reliability needs of the Hazard and Wooton Substations.

The Attorney General argues that in order for a CPCN to be authorized, Kentucky Power must demonstrate a showing of need and that the proposed projects will not result in wasteful duplication of facilities.[20] The Attorney General asserts that Kentucky Power

[18] *Id.*

[19] *Id.*

[20] Attorney General's Post-Hearing Brief at 4.

is required to also show that it appropriately considered all reasonable alternatives.[21] The Attorney General contends that by constructing the proposal so that the Baseline Projects were entirely dependent upon the Supplemental Projects, Kentucky Power sought to ensure that the approval of the instant application was guaranteed.[22]

The Attorney General also argues that the rehearing decision in Case No. 2017-00328 granting a CPCN for the reconfiguration of the Hazard-Jackson 69 kV transmission line allowed Kentucky Power to reclassify certain of the projects from Supplemental to Baseline at PJM.[23] The Attorney General asserts that redesignation of certain projects as Baseline Projects was because those projects were required to implement the reconfiguration of the Hazard-Jackson 69 kV transmission line, which was itself designated as a Baseline Project.[24] The Attorney General maintains that while Kentucky Power may contend that there is little difference between a Baseline Project and a Supplemental Project as both types of projects are required by the company to provide safe and reliable electric service, the Attorney General states that the degree of oversight provided by PJM with respect to Baseline and Supplemental Projects are not the same.[25]

The Attorney General notes that the revised stakeholder RTEP process for reviewing and evaluating Supplemental Projects at PJM provides a fairer and more transparent process for all involved.[26] The Attorney General, however, points out that the

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[21] *Id.*

[22] *Id.*

[23] *Id.* at 5.

[24] *Id.*

[25] *Id.* at 6.

process still has shortcomings such as PJM not having to approve or deny Baseline Projects submitted by Transmission Owners.[27] The Attorney General further points out that the Commission has limited ability to deny Baseline Projects, which are mandated through FERC-jurisdictional PJM processes.[28] The Attorney General thus requests that the Commission continue to appropriately scrutinize CPCN applications under the relevant statutory requirements, including that the results be fair, just, and reasonable for ratepayers.[29]

In response to the Attorney General's arguments, Kentucky Power states that it has fully demonstrated that public convenience and necessity requires the company to address the important needs at the Hazard and Wooton Substations and to implement fully those portions of the Hazard-Wooton project that was approved in Case No. 2017-00328.[30] Kentucky Power contends that the Attorney General has neither expressly challenged that public convenience and necessity requires the proposed projects at the Hazard and Wooton Substations nor has the Attorney General recommended denying the proposed projects.[31]

Kentucky Power argues that the Attorney General's assertions reflect a misunderstanding of the relationship between the previously approved Baseline components and the proposed 23 project components in this matter; a mistaken

[26] *Id.* at 7.

[27] *Id.*

[28] *Id.*

[29] *Id.* at 8.

[30] Kentucky Power Reply Brief at 1.

[31] *Id.*

understanding of the relationship between the Hazard-Wooton project approved in Case No. 2017-00328 and the 23 proposed project components in this matter; and an irrelevant and unfounded concern regarding the stakeholder review of Supplemental Projects at PJM.[32] Kentucky Power contends that the record in this proceeding demonstrates the need for the Supplemental components without regard to the previously approved Baseline components.[33] Kentucky Power also contends that the prior approval of the Hazard-Jackson 69 kV transmission line reconfiguration is unrelated to the reclassification of the nine former Supplemental Project components, noting that there is nothing in the record that suggests that the realignment of less than a mile of a 69 kV transmission line in any way makes necessary the proposed work at the Hazard or Wooton Substations and that Kentucky Power has not advanced such an argument.[34] Contrary to the Attorney General's claims, Kentucky Power avers that the record clearly establishes that the reclassification of the nine project components from Supplemental to Baseline was the result of information subsequently garnered from the detailed engineering phase of the project, which, for example, revealed that the 161/138 kV transformer and 138 kV circuit breaker M needed to be relocated to accommodate the previously approved Baseline projects.[35] Kentucky Power agrees with the Attorney General's contention that the Commission has a mandate to evaluate, and when required by the public convenience and necessity, to approve CPCN applications.[36] Kentucky

[32] *Id.*

[33] *Id.* at 4.

[34] *Id.*

[35] *Id.* at 8.

[36] *Id.* at 1–2.

Power takes issue with the Attorney General's characterization of the PJM process for reviewing Supplemental Projects, noting that the M-3 process, as it is known within PJM, provides the opportunity for stakeholders to review the Supplemental Projects and to submit their own alternatives.[37] Kentucky Power further points out that the review process involves the submission by Transmission Owners of detailed system needs and project information, including alternative solutions, and are subject to two rounds of stakeholder review.[38] More importantly, Kentucky Power asserts that the M-3 process was never intended as a substitute for the Commission's evidentiary review of the Supplemental Projects.[39] Kentucky Power maintains that the designation of a project component as either Baseline or Supplemental reflects the specific planning requirements addressed by the overall project.[40] Kentucky Power points out the fact that project components designated as Supplemental does not change the fact that they are the same type of replacement, upgrade, and system improvement work Kentucky Power previously presented to the Commission for approval, and which the Commission approved both before and after the company joined PJM.[41]

DISCUSSION

To establish that the public convenience and necessity require the construction of a new facility, an applicant must demonstrate the need for the proposed facilities and that

[37] *Id.* at 9.

[38] *Id.*

[39] *Id.* at 10.

[40] *Id.*

[41] *Id.*

the proposed construction will not result in the wasteful duplication of facilities.

"Need" requires:

> [A] showing of a substantial inadequacy of existing service, involving a consumer market sufficiently large to make it economically feasible for the new system or facility to be constructed or operated.
>
> [T]he inadequacy must be due either to a substantial deficiency of service facilities, beyond what could be supplied by normal improvements in the ordinary course of business; or to indifference, poor management or disregard of the rights of consumers, persisting over such a period of time as to establish an inability or unwillingness to render adequate service.

"Wasteful duplication" is defined as "an excess of capacity over need" and "an excessive investment in relation to productivity or efficiency, and an unnecessary multiplicity of physical properties." To demonstrate that a proposed facility does not result in wasteful duplication, we have held that the applicant must demonstrate that a thorough review of all reasonable alternatives has been performed. Selection of a proposal that ultimately costs more than an alternative does not necessarily result in wasteful duplication. All relevant factors must be balanced. The statutory touchstone for ratemaking in Kentucky is the requirement that rates set by the Commission must be fair, just, and reasonable.

Having reviewed the record and being otherwise sufficiently advised, the Commission finds that Kentucky Power has established sufficient evidence to demonstrate that the proposed transmission projects are needed to provide safe and reliable service. The Commission notes that the evidence shows that the nine project components that have been redesignated as Baseline Projects are needed to implement or facilitate the Baseline Projects that were authorized a CPCN in Case No. 2017-00328

(i.e., the rebuild of the Hazard-Wooton 161 kV transmission line, the installation of the 161/138 kV three-phase transformer in the Hazard Substation, and the reconfiguration of the Hazard-Jackson 69 kV transmission line). The record further shows that the remaining 14 project components are needed to replace and upgrade aging, deteriorating, and obsolete equipment at the Hazard Station to enable Kentucky Power to provide safe and reliable electric service. The record reflects that the Hazard Substation is nearly 80 years old, and the proposed project components sought to be replaced and upgraded consists of seven circuit breakers that are approaching or have exceeded their projected operating lives; several circuit breakers have significantly exceeded the manufacturers' recommended number of fault operations; certain identified circuit breakers, transformers, and capacitor banks are significantly deteriorated or damaged; certain oil-type circuit breakers, electromechanical and static protective relays are functionally obsolete; and outdated railings and platforms need to be upgraded to meet current safety specifications to provide additional space to guard live parts and to provide minimum clear distances to energized equipment. The record also shows that 22 of the 23 project components will bring the two substations to Kentucky Power and PJM minimum design standards. A complete identification of the needs for each of the project components is provided in Kentucky Power's response to Commission Staff's Second Request for Information, Item 3, which response is attached as Attachment 2 to this Order.

The proposed projects will also allow Kentucky Power to reconfigure the design of the Hazard Substation to improve reliability and limit degradation of substation assets. Under the current Hazard Substation configuration, the failure of a single piece of

equipment could cause an outage to the entire substation along with the 30 MW of load and approximately 1,800 customers that are served by the substation. The new configuration will sectionalize the Hazard Substation into disparate zones of protection, which would allow for isolation of faults, permits restoration of service to be done more quickly, and reduces the need for additional outages to restore service.

The Commission further finds that construction of the proposed replacement, upgrade, and system improvement work at the Hazard and Wooton Substations are reasonable and will not result in the wasteful duplication of facilities. The record shows that Kentucky Power evaluated alternatives such as rebuilding the Hazard Substation at an estimated conceptual cost of $35 million, which would include acquiring additional property and building the new substation at a distance of about five miles from the current site due to the landlocked nature of the existing site. The record also shows that Kentucky Power considered rebuilding the existing 69 kV portion of the Hazard Substation as a ring bus but determined that this alternative was not physically possible without extended outages and also not feasible due to constructability issues such as the slopes and different grade levels of the station yard.

The Commission notes that our determination and grant of a CPCN for the proposed transmission projects is based on a full and independent review of the well-developed evidentiary record under the appropriate standard of need and wasteful duplication. The consideration of these projects being designated as Baseline or Supplemental for PJM purposes is only a factor in our consideration of the establishment of the need for these proposed projects.

Although the Commission finds that Kentucky Power has established that the proposed transmission projects at the Hazard and Wooton Substations are needed and will not result in wasteful duplication, the Commission does have concerns with respect to timing and urgency with which Kentucky Power has addressed the replacement and upgrade of certain of those transmission assets. We note that the record establishes that a number of the circuit breakers have incurred a level of faults that significantly exceeds the manufacturers' recommended level of faults. For example, circuit breakers Hazard C, Leslie E, Bonnyman #2 R, and Daisy S experienced 78 to 333 faults in 2016 and 82 to 354 faults in 2017, all of which are well in excess of the manufacturers' recommended fault of 10. We further note that certain circuit breakers are oil-type design and have structural issues which could result in significant repair, replacement and cleanup costs should any of those circuit breakers fail. These circuit breakers are also 45 to 60 years old. More importantly, the evidence shows Kentucky Power's own Asset Health Score for these circuit breakers warranted immediate review and appropriate actions to be taken to address the conditions of these transmission assets. The Commission further notes that these significantly deteriorating asset conditions have been known to Kentucky Power for at least the past ten years but Kentucky Power waited until at least late 2017 to address these asset conditions. Compounding the situation is the fact that the Hazard Substation has experienced poor reliability performances within the last several years as reflected by its high numbers based on reliability metrics and that one of the root causes of poor reliability performance is due to substation equipment failures. The Commission recommends that Kentucky Power further refine its process for identifying and prioritizing transmission needs and asset condition assessment such that a transmission asset

identified as needing to be replaced or upgraded could potentially be addressed in the normal course of operating and maintaining the company's transmission facilities. This refinement should improve the reliability of a substation while also spreading the costs of such replacement or upgrade over time.

IT IS THEREFORE ORDERED that:

1. Kentucky Power's request for a CPCN is granted.

2. Kentucky Power shall file a survey of the final location of the transmission facilities after any modifications are finalized as authorized herein and before construction begins.

3. Kentucky Power shall file "as-built" drawings within 60 days of the completion of the construction authorized by this Order.

4. Kentucky Power shall immediately notify the Commission upon knowledge of any material changes to the scope of the transmission projects, including, but not limited to, increase in cost or any significant delays in the construction of the transmission project components.

5. Any documents filed pursuant to ordering paragraph 2, 3, and 4 of this Order shall reference the case number of this matter and shall be retained in the post-case correspondence file of this matter.

6. This matter is closed and shall be removed from the Commission's docket.

By the Commission

ENTERED

MAY 28 2020 rcs

KENTUCKY PUBLIC SERVICE COMMISSION

ATTEST:

Acting General Counsel

ATTACHMENT 1

ATTACHMENT TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2019-00154 DATED MAY 28 2020

[EIGHT PAGES TO FOLLOW]

HAZARD SUBSTATION ELEMENTS

Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
a b	(1)	**Replacement of the 161 kV circuit breaker (M) pointing towards Wooton Station.** - Replacement of devices for line protection and circuit breaker control associated with the 161kV Wooton line position	To permit the interruption of fault current or load current on the 161kV line towards Wooton Station and 161/138 kV transformer #3 at Hazard station. Microprocessor relays and controls to monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	This breaker must be moved to accommodate the approved Baseline project elements (B2761) already approved by the KY PSC. Circuit breaker M was manufactured in 1988 and has experienced 21 fault operations (which exceeds the manufacturer's recommendation of 10). Replacing this breaker at this point is appropriate rather than re-installing the existing breaker, which is over 30 years old, at the new location. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
d e	(2)	**Installation of a 138 kV circuit breaker with relay control on the low side of the 161 kV/138 kV transformer #3** - Replacement of devices for transmission transformer protection associated with Transformer #3	To permit the interruption of fault or load current on the 138kV side of the new #3 161/138kV transformer. To provide automatic, manual, and remote (via SCADA) control of the breaker. To provide proper sectionalizing to minimize the number of elements that must operate to clear a fault on the transformer. Microprocessor relays and controls to monitor currents entering and leaving the Transformer #3, trip the 161kV high side breaker and the 138kV low side breaker to isolate the transformer when the current differential reaches a programmed set point. Equipment also will report equipment status (temperature, pressure, currents), record events and provide automatic operation of the breakers as programmed for other parameters such as an internal sudden pressure increase.	The existing 1940's vintage single phase banks that make up Transformer #3 are being replaced by a three phase transformer as part of the Baseline project already approved by the KY PSC. The circuit breaker on the low side of the transformer and the microprocessors (Identified (e)) will allow the transformer to be protected and isolated, if necessary, to prevent damage during a fault operation. The low side breaker also separates the zones of protection and minimizes the number of elements that must operate for a fault on the transformer. Under the existing configuration at Hazard, lack of the low side breaker on the transformer results in the operation of every element tied to 138 kV bus #2 and 69 kV bus #2 in order to clear a fault on Transformer # 3. This includes operation of Transformers #4 and #5 resulting in the loss of customers served from the two transformers. The microprocessor relays and controls also will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
f	(3)	**Installation of a new three phase 161 kV/138kV spare transformer**	To facilitate timely restoration of service in the event of a failure of the #3 161/138kV transformer.	The 161/138 kV transformer at Hazard station is the only transformer of this voltage class on the AEP Eastern footprint. A spare transformer must be maintained on site as a replacement in the event of a failure of the existing transformer. Without a spare, the lead times required to replace this type of transformer could be up to a year.
aa	(4)	**Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #2 (R) line position**	Microprocessor relays and controls to monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
J k	(5)	**Replacement of 138 kV capacitor bank and switcher BB** - Replacement of devices for capacitor bank and switcher BB protection and control	To provide voltage support and reactive power to the 138kV Bus #2. Microprocessor relays and controls to monitor currents and voltage, provide trip/close signals to the switcher and report equipment status locally and remotely via SCADA.	The existing circuit switcher is a MARK V unit. Mark V units have experienced a high amount of failures and mis-operations on the AEP system. AEP operating companies are currently replacing all MARK V circuit switchers to remedy these reliability concerns The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
N N/A O p	(6)	**Replacement of existing 138kV/69kV Transformer #1** - Replacement of the motor operated air break (MOAB) switch and installation of a circuit switcher on the high-side of Transformer #1 - Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #1 - Replacement of devices for transmission transformer protection associated with Transformer #1	To stepdown the 138kV transmission voltage to the 69kV sub-transmission voltage level. To isolate the 138/69kV Transformer #1 from the 138kV Bus #1 for: an internal transformer fault or overload, a fault on 138kV Bus #1, manual isolation of Transformer #1 for maintenance and testing. To permit the interruption of fault or load current on the 69kV side of the 138/69 Transformer #1. To provide automatic, manual and remote (via SCADA) control of the breaker. Microprocessor relays and controls to: monitor currents entering and leaving the Transformer #1, trip the 138kV high side breaker and the 69kV low side breaker to isolate the transformer when the current differential reaches a programmed set point. To report equipment status (temperature, pressure, currents), record events and provide automatic operation of the breakers as programmed for other parameters such as an internal sudden pressure increase.	Transformer #1 was manufactured in 1973 and is showing dielectric breakdown (i.e. insulation breakdown), accessory damage of bushings and windings, and short circuit breakdown due to the amount of through faults. It is also showing signs of corrosion on the radiators and has oil leaks. Given the condition of the existing transformer, it is appropriate to replace it now. The current MOAB/ Ground switch configuration on the high side of transformer #1 creates a fault in the station to signal the remote end breakers to open; this is a known safety hazard in legacy station designs. Under the existing configuration at Hazard, lack of a high side switcher and low side breaker on the transformer results in the operation of every element tied to 138 kV bus #1 and 69 kV bus #1 in order to clear a fault on Transformer # 1. It also exposes the transformer to potentially damaging currents for faults tied to 138 kV bus #1 and 69 kV bus #1. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
T S U v	(7)	**Replacement of existing 138kV/69kV Transformer #2** - Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #2 - Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #2 - Replacement of devices for transmission transformer protection associated with Transformer #2	To stepdown the 138kV transmission voltage to the 69kV sub-transmission voltage level. To isolate the 138/69kV Transformer #2 from the 138kV Bus #2 for: an internal transformer fault or overload, a fault on 138kV Bus #2, manual isolation of Transformer #2 for maintenance and testing. To permit the interruption of fault or load current on the 69kV side of the 138/69 Transformer #2. To provide automatic, manual and remote (via SCADA) control of the breaker. Microprocessor relays and controls to: monitor currents entering and leaving the Transformer #2, trip the 138kV high side breaker and the 69kV low side breaker to isolate the transformer when the current differential reaches a programmed set point. To report equipment status (temperature, pressure, currents), record events and provide automatic operation of the breakers as programmed for other parameters such as an internal sudden pressure increase.	Transformer #2 was manufactured in 1974 and is showing dielectric breakdown (i.e. insulation breakdown), accessory damage of bushings and windings, and short circuit breakdown due to the amount of through faults. Replacement of this transformer is appropriate given the current condition. Under the existing configuration at Hazard, lack of a high side switcher and low side breaker on the transformer results in the operation of every element tied to 138 kV bus #2 and 69 kV bus #2 in order to clear a fault on Transformer # 2. This includes operation of Transformers #4 and #5 resulting in the loss of customers served from the two transformers. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
W X	(8)	**Replacement of 69kV capacitor bank and switcher CC** - Replacement of devices for capacitor bank and switcher CC protection and control	To provide voltage support and reactive power to the 69kV Bus #2. Microprocessor relays and controls to: monitor currents and voltage, provide trip/close signals to the switcher and report equipment status locally and remotely via SCADA.	Capacitor switcher CC has oil leaks on all three phases and cannot be repaired. Capacitor Bank CC was a non-standard design and its components, including fuses and cans, have begun to fail. The proposed equipment will remedy these issues. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
bb cc	(9)	**Replacement of the 69kV circuit breaker (S) pointing towards Daisy Station** - - - - Replacement of devices for line protection and circuit breaker control associated with the 69kV Daisy line position	To permit the interruption of fault current or load current on the 69kV line towards Daisy Station and the 69kV Bus #1. Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	Circuit breaker S was manufactured in 1960 and has experienced 82 faults (well above the manufacturer's recommended 10). This is an oil breaker which is difficult to maintain and carries the potential of oil related spills during maintenance or failures. Other drivers include potential PCB content and damage to bushings. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
dd ee	(10)	**Replacement of the 69kV circuit breaker (E) pointing towards Leslie Station** - Replacement of devices for line protection and circuit breaker (E) control associated with the 69kV Leslie line position	To permit the interruption of fault current or load current on the 69kV line towards Leslie Station. To provide protection on the 69 kV bus #1 Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	Circuit breaker E was manufactured in 1974 and has experienced 184 faults (well above the manufacturer's recommended 10). This is an oil breaker which is difficult to maintain and carries the increased potential of oil related spills during maintenance or failures. Other drivers include potential PCB content and damage to bushings. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
ff gg	(11)	**Replacement of the 69kV circuit breaker (F) pointing towards Bonnyman Station via the number one circuit** - Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #1 line position	To permit the interruption of fault current or load current on the 69kV line towards Bonnyman Station and the 69kV Bus #1. Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	Circuit Breaker (F) was manufactured in 1985 and has experienced 193 fault operations (well above the manufacturer's recommended 10). This circuit breaker is an oil filled breaker that is difficult to maintain and carries the increased potential of oil spills during routine maintenance and failures. Other drivers include potential PCB content and damage to bushings. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
hh	(12)	**Installation of a 69kV circuit breaker connecting 69 kV bus #1 and bus #2**	To provide a means to serve the 69kV Bus #1 from the 69kV Bus #2 in the event of the loss of the 138/69kV Transformer #1 and to serve the 69kV Bus #2 from the 69kV Bus #1 in the event of the loss of the 138/kV Transformer #2.	Isolating the 69kV system will allow the 69kV system to stay in-service despite an outage on the 138kV system and will provide greater operational flexibility. It also allows the retirement of capacitor bank AA which is beginning to show issues associated with deterioration and its VBM type capacitor switcher.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
	(13)	**Protection of Existing Transformer #4**		Protection of the transformer on both the high side and low side will be upgraded to address concerns with dissimilar zones or protection. Under the existing configuration at Hazard a fault on transformer #4 would result in the operation of every element associated with 138 kV bus #1 and 69 kV bus #2.
ii		- Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #4	To isolate the 138/34kV Transformer #4 from the 138kV Bus #2 for: an internal transformer fault or overload, a fault on 138kV Bus #2, manual isolation of Transformer #2 for maintenance and testing.	
jj		- Installation of a 34.5kV breaker with relay control on the low-side of 138kV/34.5kV Transformer #4	To permit the interruption of fault or load current on the 34kV side of the 138/34 Transformer #4. To provide automatic, manual and remote (via SCADA) control of the breaker.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
kk		- Replacement of devices for transmission transformer protection associated with Transformer #4	Microprocessor relays and controls to: monitor currents entering and leaving the Transformer #4, trip the 138kV high side switcher and the 34kV low side breaker to isolate the transformer when the current differential reaches a programmed set point. To report equipment status (temperature, pressure, currents), record events and provide automatic operation of the breakers as programmed for other parameters such as an internal sudden pressure increase.	
ll	(14)	**Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Blackgold line position**	Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
mm	(15)	**Replacement of the 34.5kV circuit breaker (A) pointing towards Kenmont Station**	To permit the interruption of fault current or load current on the Hazard – Kenmont 34kV Circuit.	The Existing circuit breaker (A) is 30 years old and has had 221 fault operations (well above the manufacturers recommended 10). The existing breaker is a vacuum oil breaker, which presents potential environmental and maintenance concerns similar to the 69 kV breakers above.
nn		- Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Kenmont line position	Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
oo	(16)	**Replacement of devices for distribution transformer protection associated with Transformer #5;**	Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
pp qq	(17)	**Replacement of the 12kV circuit breaker (c) servicing Hazard** - Replacement of devices for feeder protection and circuit breaker control associated with the 12kV Hazard feeder position	To permit the interruption of fault current or load current on the Hazard – Hazard 12kV Circuit. Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The existing circuit breaker C is 50 years old and has had 354 fault operations. This circuit breaker is an oil filled breaker that is difficult to maintain and carries the increased potential of oil spills during routine maintenance and failures. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
rr ss	(18)	**Replacement of the 12kV (D) circuit breaker spare** - Replacement of devices for feeder protection and circuit breaker control associated with the 12kV spare feeder position	Provides a backup breaker for the Hazard 12kV distribution in the event of a failure of the Hazard – Hazard 12kV breaker. Microprocessor relays and controls to: monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The existing circuit breaker D is a 50-year old oil type breaker. This circuit breaker and presents potential environmental and maintenance challenges similar to the 69 kV breakers above. The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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Previous Identifier from Exhibit 10	One Line Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
y,q	(19)	**Protection and sectionalizing of the substation:** - Installation of coupling capacitor voltage transformers on 69kV Bus #1 and #2	To provide the voltage level on the 69kV Bus #2 to: the control relays for the capacitor bank CC and remotely via SCADA.	Work is required to meet industry accepted protection and control standards that ensure the safe and reliable operation of equipment at Hazard station.
z,r		- Installation of devices for 69kV Bus #1 and #2 protection	Microprocessor relays and controls to: monitor currents entering and leaving the 69kV Bus #2 and trip the 69kV breakers and circuit switchers to isolate the 69kV Bus #2 when the current differential reaches a programmed set point	
g		- Replacement of coupling capacitor voltage transformers on 138kV Bus #2	To provide the voltage level on the 138kV Bus #2 to: the control relays for the capacitor bank BB and remotely via SCADA.	
h		- Replacement of devices for 138kV Bus #2 protection	Microprocessor relays and controls to: monitor currents entering and leaving the 138kV Bus #2 and trip the 138kV breakers and circuit switchers to isolate the 138kV Bus #2 when the current differential reaches a programmed set point.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.
N/A	(20)	**Installation of a 138 kV circuit breaker pointing towards Beckham Station.**	To permit the interruption of fault current or load current on the 161kV line towards Beckham Station and 138 kV bus #1 at Hazard station.	A 138 kV circuit breaker will installed at Hazard station on the line exit towards Beckham station to separate dissimilar zones of protection. Under the existing configuration at Hazard, lack of 138 kV circuit breaker on the line towards Beckham results in the operation of every element tied to 138 kV bus #1 and 69 kV bus #1 in order to clear a fault on the ~16.4 mile circuit between Hazard and Beckham. The existing configuration will also result in the loss of customers served from Vicco station in order to clear a fault on 138 kV bus #1 at Hazard station.
N/A		Replacement of devices for line protection and circuit breaker control associated with the 138kV Beckham line position	Microprocessor relays and controls to monitor currents, report equipment status, record events, provide automatic, manual and remote (via SCADA) operation of the breaker as programmed.	The microprocessor relays and controls will ensure that the protected equipment can communicate and operate effectively once installed. The electromechanical relays that are currently used in the station are obsolete.

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WOOTON SUBSTATION ELEMENTS

Table Identifier	**Description**	**Purpose**	**Driver for Asset Replacement/Installation**
(A)	Installation of station class surge arresters attached to the upper beam of the existing 161kV box bay structure on the 161kV Hazard Line position	To provide overvoltage protection caused by lightning or switching surges for the 161kV bus insulation.	Installation of station class surge arrestors on line entrances is an industry accepted practice to protect equipment from potential overvoltage events
(B)	Installation of two coupling capacitor voltage transformers on Phase 2 and Phase 3 of the 161kV bus	To provide voltage sensing on Phase 2 and Phase 3. Presently, the 161kV bus only has voltage sensing on Phase 1.	Three phase CCVTs provide the ability to apply industry accepted protection and control standards that a single phase CCVT arrangement is unable to.
(C)	Installation of telecommunication fiber equipment	To provide remote monitoring and operation (via SCADA) of equipment at Wooton Station.	Required to utilize new fiber path provided by previously approved OPGW telecommunications cable on the approved Hazard – Wooton 161 kV line.

ATTACHMENT 2

ATTACHMENT TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2019-00154 DATED MAY 28 2020

[SIX PAGES TO FOLLOW]

Application Exhibit 2 Identifer:	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
1	Replacement of the 161 kV circuit breaker (M) pointing towards Wooton Station.	X	X		
1	Replacement of devices for line protection and circuit breaker control associated with the 161kV Wooton line position	X	X	X	PJM Manual 07, Section 7 - Line Protection
2	Installation of a 138 kV circuit breaker with relay control on the low side of the 161 kV/138 kV transformer #3	X		X	PJM Relay Subcommittee, Protective Relaying Philosophy and Design Guidelines Section 2: Protective Relaying Philosophy
2	Replacement of devices for transmission transformer protection associated with Transformer #3	X	X	X	PJM Manual 07, Section 8 - Substation Transformer Protection
3	Installation of a new three phase 161 kV/138kV spare transformer		X		
4	Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #2 (R) line position		X	X	PJM Manual 07, Section 7 - Line Protection
5	Replacement of 138 kV capacitor bank and switcher BB		X	X	AEP/KY Power Standard Mitigation Indicator List Item 1
5	Replacement of devices for capacitor bank and switcher BB protection and control		X	X	PJM Manual 07, Section 11 - Shunt Capacitor Protection
6	Replacement of existing 138kV/69kV Transformer #1		X		

Application Exhibit 2 Identifer:	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
6	Replacement of the motor operated air break (MOAB) switch and installation of a circuit switcher on the high-side of Transformer #1			X	PJM Manual 07, Section 8 - Substation Transformer Protection
6	Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #1			X	PJM Manual 07, Section 8 - Substation Transformer Protection
6	Replacement of devices for transmission transformer protection associated with Transformer #1		X	X	PJM Manual 07, Section 8 - Substation Transformer Protection
7	Replacement of existing 138kV/69kV Transformer #2		X		
7	Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #2			X	PJM Manual 07, Section 8 - Substation Transformer Protection
7	Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #2			X	PJM Manual 07, Section 8 - Substation Transformer Protection
7	Replacement of devices for transmission transformer protection associated with Transformer #2		X	X	PJM Manual 07, Section 8 - Substation Transformer Protection
8	Replacement of 69kV capacitor bank and switcher CC		X		

Application Exhibit 2 Identifer:	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
8	Replacement of devices for capacitor bank and switcher CC protection and control		X	X	PJM Manual 07, Section 11 - Shunt Capacitor Protection
9	Replacement of the 69kV circuit breaker (S) pointing towards Daisy Station		X		
9	Replacement of devices for line protection and circuit breaker control associated with the 69kV Daisy line position		X	X	PJM Manual 07, Section 7 - Line Protection; IEEE PSRC I22 Report
10	Replacement of the 69kV circuit breaker pointing towards Leslie Station		X		
10	Replacement of devices for line protection and circuit breaker (E) control associated with the 69kV Leslie line position		X	X	PJM Manual 07, Section 7: Line Protection; IEEE PSRC I22 Report
11	Replacement of the 69kV circuit breaker (F) pointing towards Bonnyman Station via the number one circuit		X		
11	Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #1 line position		X	X	PJM Manual 07, Section 7 - Line Protection; IEEE PSRC I22 Report
12	Installation of a 69kV circuit breaker connecting 69 kV bus #1 and bus #2		X	X	PJM DEDSTF Section 4.3 - Bus Configuration
13	Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #4			X	PJM Manual 07, Section 8 - Substation Transformer Protection

Application Exhibit 2 Identifer:	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
13	Installation of a 34.5kV breaker with relay control on the low-side of 138kV/34.5kV Transformer #4			X	PJM Manual 07, Section 8 - Substation Transformer Protection
13	Replacement of devices for transmission transformer protection associated with Transformer #4		X	X	PJM Manual 07, Section 8 - Substation Transformer Protection
14	Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Blackgold line position		X	X	PJM Manual 07 Section 7 - Line Protection; IEEE PSRC I22 Report
15	Replacement of the 34.5kV circuit breaker (A) pointing towards Kenmont Station		X		
15	Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Kenmont line position		X	X	PJM Manual 07 Section 7 - Line Protection; IEEE PSRC I22 Report
16	Replacement of devices for distribution transformer protection associated with Transformer #5		X	X	IEEE PSRC I22 Report
17	Replacement of the 12kV circuit breaker (c) servicing Hazard		X		
17	Replacement of devices for feeder protection and circuit breaker control associated with the 12kV Hazard feeder position		X	X	IEEE PSRC I22 Report
18	Replacement of the 12kV (D) circuit breaker spare		X		

Application Exhibit 2 Identifer:	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
18	Replacement of devices for feeder protection and circuit breaker control associated with the 12kV spare feeder position		X	X	IEEE PSRC I22 Report
19	Installation of coupling capacitor voltage transformers on 69kV Bus #1 and #2			X	PJM Manual 07, Section 7 - Line Protection
19	Installation of devices for 69kV Bus #1 and #2 protection			X	PJM DEDSTF Section 5.2 - System Protection Requirements for Facilities below 200kV ; PJM Manual 07, Section 9 - Bus Protection; PJM Manual 07, Appendix A - Use of Dual Trip Coils
19	Replacement of coupling capacitor voltage transformers on 138kV Bus #2	X		X	PJM DEDSTF Section 4.4 - Accessability, Section 4.11 - Raceways
19	Replacement of devices for 138kV Bus #2 protection	X	X	X	PJM DEDSTF Section 5.2 - System Protection Requirements for Facilities below 200kV ; PJM Manual 07, Section 9 - Bus Protection; PJM Manual 07, Appendix A - Use of Dual Trip Coils
20	Installation of a 138 kV circuit breaker pointing towards Beckham Station.			X	PJM Manual 07 Section 7 - Line Protection; AEP Standard Mitigation Indicator List Item 1
20	Replacement of devices for line protection and circuit breaker control associated with the 138kV Beckham line position		X	X	PJM Manual 07 Section 7 - Line Protection; AEP Standard Mitigation Indicator List Item 1

Application Exhibit 2 Identifier	Work Description	Needed to implement the construction approved in Case No. 2017-00328	Needed to address deteriorating and obsolete equipment	Needed to comply with existing PJM and Kentucky Power design standards	PJM/Kentucky Power design standards reference
A	Installation of station class surge arresters attached to the upper beam of the existing 161kV box bay structure on the 161kV Hazard Line position	X		X	PJM DEDSTF Section 4.7 - Insulation Coordination and Lighting Protection
B	Installation of two coupling capacitor voltage transformers on Phase 2 and Phase 3 of the 161kV bus	X		X	PJM Manual 07, Section 7 - Line Protection (required to coordinate protection with Hazard remote end)
C	Installation of telecommunication fiber equipment	X		X	PJM Manual 07, Section 7 - Line Protection (required to coordinate protection with Hazard remote end)

*Christen M Blend
American Electric Power Service Corporation
1 Riverside Plaza, 29th Floor
Post Office Box 16631
Columbus, OHIO 43216

*John W. Pollom
Stites & Harbison
421 West Main Street
P. O. Box 634
Frankfort, KENTUCKY 40602-0634

*Kentucky Power Company
1645 Winchester Avenue
Ashland, KY 41101

*Katie M Glass
Stites & Harbison
421 West Main Street
P. O. Box 634
Frankfort, KENTUCKY 40602-0634

*Larry Cook
Assistant Attorney General
Office of the Attorney General Office of Rate
700 Capitol Avenue
Suite 20
Frankfort, KENTUCKY 40601-8204

*J. Michael West
Office of the Attorney General Office of Rate
700 Capitol Avenue
Suite 20
Frankfort, KENTUCKY 40601-8204

*Honorable Mark R Overstreet
Attorney at Law
Stites & Harbison
421 West Main Street
P. O. Box 634
Frankfort, KENTUCKY 40602-0634