Kentucky Power Company
KPSC Case No. 2019-00154
Commission Staff's 1st Set of Data Requests
Dated September 16, 2019

DATA REQUEST

KPSC 1_1 Refer to the Direct Testimony of Kamran Ali (Ali Testimony), unnumbered page 13, lines 14-19, regarding the three-phase 161 /138 kilovolts (kV) spare transformer. Explain whether this type of transformer would be a transmission asset that is covered under the Subscription Agreement that Kentucky Power has entered into with Grid Assurance, LLC.

RESPONSE

Yes. The Grid Assurance, LLC Subscription Agreement covers three phase 161/138 kV transformers.

However, the Subscription Agreement is limited to Qualifying Events. These Qualifying Events include catastrophic events such as a natural disaster or a physical or cyber-attack. The Subscription Agreement does not cover, and is not a substitute for the need to have, spare transformers for the planned outages and more routine forced outages referred to by Company Witness Ali.

Witness: Kamran Ali

DATA REQUEST

KPSC 1_2 Refer to the Ali Testimony, unnumbered page 14, lines 12-17.
a. Identify the nine project components that were previously designated as Supplemental Projects but are now reclassified as Baseline Projects by PJM.
b. Explain when these project components were designated by PJM as Baseline Projects along with the identified need for these particular project components and the determination that these components represent the optimal solution to address those needs.

RESPONSE

a. The following nine components were previously identified as Supplemental and are now classified as Baseline:

Hazard Station Work	**Exhibit 2 One Line Identifier**
1. Replacement of the 161 kV circuit breaker (M) pointing towards Wooton Station.	1
2. Replacement of devices for line protection and circuit breaker control associated with the 161kV Wooton line position	1
3. Installation of a 138 kV circuit breaker with relay control on the low side of the 161 kV/138 kV transformer #3	2
4. Replacement of devices for transmission transformer protection associated with Transformer #3	2
5. Replacement of coupling capacitor voltage transformers on 138kV Bus #2	19
6. Replacement of devices for 138kV Bus #2 protection	19
Wooton Station Work	**Exhibit 2 One Line Identifier**
7. Installation of station class surge arresters attached to the upper beam of the existing 161kV box bay structure on the 161kV Hazard Line position	A
8. Installation of two coupling capacitor voltage transformers on Phase 2 and Phase 3 of the 161kV bus	B
9. Installation of telecommunication fiber equipment	C

b. The project designation changes were reviewed with stakeholders by PJM during the April 23, 2019 Subregional RTEP Western meeting. The project was subsequently approved by the PJM Board on July 29, 2019.
The information presented can be found at: https://www.pjm.com/-/media/committees-groups/committees/srrtep-w/20190423/20190423-reliability-analysis-update.ashx

Witness: Kamran Ali

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DATA REQUEST

KPSC 1_3 Refer to the Ali Testimony, beginning at unnumbered page 14, line 18, through unnumbered page 15, line 7. Explain in further detail why the project components that were reclassified from Supplemental to Baseline are needed to complete the previously certificated Hazard - Wooten 161 kV transmission line and the new 161 /138 kV single-phase transformers at the Hazard Substation.

RESPONSE

Kentucky Power notes that the previously certificated Hazard Wooton scope of work comprises a new three-phase 161/138 kV transformer that would replace the existing three single-phase 138/161 kV transformers.

The components were reclassified from supplemental to baseline to 1) to permit the termination of the 161k V transmission line into both Hazard and Wooton stations and 2) to accommodate Transformer #3 in Hazard station. The components affected by these requirements are identified in Staff 1-002(a). Due to the site constraints at the Hazard station, circuit breaker M is required to be relocated to accommodate Transformer #3. This also includes work associated with the relays and equipment to provide necessary protection and control for Transformer #3 and the 161 kV line.

Witness: Kamran Ali

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DATA REQUEST

KPSC 1_4 Refer to the Ali Testimony, Exhibit KA-1, page 9 of 16. Pursuant to the AEP process for addressing transmission owner identified needs, an asset condition assessment is performed to determine a transmission asset's historical deterioration, current condition, and future expectation. Further, it is provided that AEP annually assembles a list of reported condition issues for all of its assets in its system and a follow-up review is conducted to determine if a transmission asset is in need of upgrade or replacement. To the extent Kentucky Power is claiming that certain of the proposed project elements is needed due to significant deterioration, obsolescence and/or aging condition, state whether any of these transmission assets that are proposed to be replaced or upgraded (i.e., 69 kV circuit breakers, electromechanical and static relays, and transformers) were identified within the last ten years as needing to be addressed. If so, explain why Kentucky Power waited until now to replace or upgrade these transmission assets and doing it all at one time.

RESPONSE

All of the transmission elements Kentucky Power is proposing to replace or upgrade "were identified within the last ten years as needing to be addressed".

The Company's process for identifying needs can in some instances identify those needs well in advance of the time the solution must be implemented. The timing of implementation of project solutions is driven by various factors including the severity of the asset condition, outage availability and other factors as described in Exhibit KA-1 to Company Witness Ali's direct testimony. Kentucky Power also evaluates opportunities to combine solutions in order to limit costs, take advantage of efficiencies, and/or limit the number of outages. This consideration may affect the timing of project implementation.

In the case of the Hazard and Wooton Stations, the accumulation of equipment issues associated with the Supplemental components of the project, highlighted in the Company's Application, led to the determination that the project should be performed as proposed.

Witness: Kamran Ali

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DATA REQUEST

KPSC 1_5 Refer to the Direct Testimony of Michael G. Lasslo (Lasslo Testimony), page 13, lines 1-20, in connection with the proposed work at the Hazard Substation.

a. Regarding the replacement of Transformer #1 and Transformer #2, explain why these transformers have experienced dielectric breakdowns, damage to bushings and windings, and short circuit breakdowns to the point that they are in need of replacement given that these transformers are 14-15 years from their projected life expectancy.

b. Regarding the replacement of the various circuit breakers, explain why Kentucky Power has waited until now to replace these circuit breakers given that these circuit breakers have experienced faults that significantly exceeds the number of faults recommended by the manufacturer.

RESPONSE

a. Age is just one of the many factors that affect the need for and timing of the replacement of equipment. Equipment can begin to deteriorate prior to meeting its projected life expectancy. For example, Transformers #1 and #2 have been subject to electrical discharges of high energy, thermal faults, stray gassing and overheating due to system conditions over their lives. All of these contributed to dielectric, accessory, and short circuit strength breakdown. Maintenance practices have kept this equipment operational. The accumulation of the aforementioned conditions led Kentucky Power to propose replacing the transformers.

Similarly, Transformer #4, which was 1990's vintage, failed in May 2017, causing an outage that affected all customers connected to the Hazard station. This equipment failure occurred well in advance of its expected useful life, causing the transformer to be replaced.

b. Circuit breaker counters record faults without regard to the fault current level. The manufacturer's recommendation for the circuit breakers identified by Mr. Lasslo is ten fault operations during their useful life. Any fault operation accelerates aging and wear of the contacts as well as other internal components. Additionally, these breaker types are no longer being installed or supported by their manufacturers, so spare parts are not available for repairs as they may have been in the past. Maintenance practices have kept these breakers operational. The accumulation of the fault operations as well as other issues such as lack of spare parts and vendor support, maintenance challenges, and environmental risks have made these replacements necessary.

Witness: Michael G. Lasslo

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DATA REQUEST

KPSC 1_6 Refer to the Lasslo Testimony, beginning at page 14, line 14, through page 15, line 5, regarding the reliability benefits of the reconfiguration work and equipment additions at the Hazard and Wooton Substations. Explain whether Kentucky Power has quantified the reliability benefits of the proposed transmission project elements and, if so, provide that analysis.

RESPONSE

An outage of the Hazard station could result in direct adverse effects to approximately 30 MW of load and approximately 1,800 customers, and increase the risk of disruption to other customers in the surrounding area.

The Company has not quantified the specific SAIDI or SAIFI (outage duration and frequency, respectively) reliability benefits of the proposed transmission project elements. However, by addressing a Baseline need identified by PJM, this project inherently addresses a reliability issue. Further, the Supplemental components of the projects add sectionalizing to the station. Separating individual elements into their own isolation zone allows for other elements at the station to remain in service under fault conditions. Today, an outage of a single component could result in an outage of the whole station. Sectionalizing improves the reliability of each element and the station overall. See Exhibit 2 to the Application. Also, when there are multiple overlapping zones of protection, the breakers in the station have to operate for any given fault at the station. When each breaker operates for a fault, the expected life of each breaker is reduced every time a fault occurs. Separating the zones and protection devices helps to increase the useful life of new assets.

Witness: Michael G. Lasslo

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DATA REQUEST

KPSC 1_7 Refer to the Lasslo Testimony, beginning at page 17, line 2, through page 18, line 16, regarding mobilization costs. Quantify the projected increase in cost if the project components were to be done in a phased approached.

RESPONSE

The requested analysis has not been performed and cannot be performed without specifying the number and scope of the mobilizations (phases) to be undertaken. The number of phases, and scope of each phase, would affect the cost.

Company Witness Lasslo provided an estimate of $50,000 - $250,000 or more per mobilization. That range reflects, for example, that the mobilization cost to replace one circuit breaker could be on the low range, but the mobilization cost to perform structure erection, large excavations, or large power transformer replacement could be more toward the middle to high range. In addition, multiple mobilizations could result in additional, and potentially duplicative, costs. For more information regarding factors that affect mobilization expense, refer to Company Witness Lasslo's testimony on page 17 lines 2 through 17. Although in certain circumstances performing a project in phases may be appropriate, a phased approach is neither necessary nor cost-effective for the project in this Application.

The Company further notes that a project element may be accelerated if doing so in conjunction with another project element will permit Kentucky Power to limit total mobilization and related costs, limit the number of outages, or increase other efficiencies. The Company's goal in grouping work is to perform the work in the most cost-effective and efficient manner, and thereby limit the costs, disruptions, and inconveniences ultimately borne by Kentucky Power's customers.

Witness: Michael G. Lasslo

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DATA REQUEST

KPSC 1_8 Refer to the Direct Testimony of Ranie K. Wohnhas (Wohnhas Testimony), page 6, lines 1-7. For each of the proposed project elements for the Hazard and Wooton Substations, identify which elements fall into the following categories referenced in the testimony: (1) those that are needed to implement the construction approved in Case No. 2017-00328; (2) those that are deteriorating and obsolete; and (3) those that are needed to comply with existing PJM and Kentucky Power design standards.

RESPONSE

See KPCO_R_KPSC_1_8_Attachment1 for a list of elements and the categories of those elements for the Hazard station.

See KPCO_R_KPSC_1_8_Attachment2 for a list of elements and the categories of those elements for the Wooton station.

Witness: Kamran Ali

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
Replacement of the 161 kV circuit breaker (M) pointing towards Wooton Station.	X	X	
Replacement of devices for line protection and circuit breaker control associated with the 161kV Wooton line position	X	X	X
Installation of a 138 kV circuit breaker with relay control on the low side of the 161 kV/138 kV transformer #3	X		X
Replacement of devices for transmission transformer protection associated with Transformer #3	X	X	X
Installation of a new three phase 161 kV/138kV spare transformer		X	
Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #2 (R) line position		X	X
Replacement of 138 kV capacitor bank and switcher BB		X	X
Replacement of devices for capacitor bank and switcher BB protection and control		X	X
Replacement of existing 138kV/69kV Transformer #1		X	

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
Replacement of the motor operated air break (MOAB) switch and installation of a circuit switcher on the high-side of Transformer #1			X
Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #1			X
Replacement of devices for transmission transformer protection associated with Transformer #1		X	X
Replacement of existing 138kV/69kV Transformer #2		X	
Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #2			X
Installation of a 69kV breaker with relay control on the low-side of 138kV/69kV Transformer #2			X
Replacement of devices for transmission transformer protection associated with Transformer #2		X	X
Replacement of 69kV capacitor bank and switcher CC		X	

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
Replacement of devices for capacitor bank and switcher CC protection and control		X	X
Replacement of the 69kV circuit breaker (S) pointing towards Daisy Station		X	
Replacement of devices for line protection and circuit breaker control associated with the 69kV Daisy line position		X	X
Replacement of the 69kV circuit breaker (E) pointing towards Leslie Station		X	
Replacement of devices for line protection and circuit breaker (E) control associated with the 69kV Leslie line position		X	X
Replacement of the 69kV circuit breaker (F) pointing towards Bonnyman Station via the number one circuit		X	
- Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman #1 line position		X	X
Installation of a 69kV circuit breaker connecting 69 kV bus #1 and bus #2		X	X
Replacement of the motor operated air break switch and installation of a circuit switcher on the high-side of Transformer #4			X

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
Installation of a 34.5kV breaker with relay control on the low-side of 138kV/34.5kV Transformer #4			X
Replacement of devices for transmission transformer protection associated with Transformer #4		X	X
Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Blackgold line position		X	X
Replacement of the 34.5kV circuit breaker (A) pointing towards Kenmont Station		X	
Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Kenmont line position		X	X
Replacement of devices for distribution transformer protection associated with Transformer #5;		X	X
Replacement of the 12kV circuit breaker (c) servicing Hazard		X	
Replacement of devices for feeder protection and circuit breaker control associated with the 12kV Hazard feeder position		X	X
Replacement of the 12kV (D) circuit breaker spare		X	

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
Replacement of devices for feeder protection and circuit breaker control associated with the 12kV spare feeder position		X	X
Installation of coupling capacitor voltage transformers on 69kV Bus #1 and #2			X
Installation of devices for 69kV Bus #1 and #2 protection			X
Replacement of coupling capacitor voltage transformers on 138kV Bus #2	X		X
Replacement of devices for 138kV Bus #2 protection	X	X	X
Installation of a 138 kV circuit breaker pointing towards Beckham Station.			X
Replacement of devices for line protection and circuit breaker control associated with the 138kV Beckham line position		X	X

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**
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
Installation of two coupling capacitor voltage transformers on Phase 2 and Phase 3 of the 161kV bus	X		X
Installation of telecommunication fiber equipment	X		X

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DATA REQUEST

KPSC 1_9 Refer to the Wohnhas Testimony, page 8, lines 17-20, regarding the estimated cost of the proposed project. Provide an itemization for the cost of each component of the proposed project.

RESPONSE

See KPCO_R_KPSC_1_9_Attachment1 for the estimated cost of the Hazard Station portion of the project.

See KPCO_R_KPSC_1_9_Attachment2 for the estimated cost of the Wooton Station portion of the project.

Construction, engineering, and commissioning costs cannot be assigned to individual project components.

Witness: Ranie K. Wohnhas

Hazard Breakdown					
Exhibit 2 Oneline ID	Description	Estimate			
		Material	Construction	Commissioning	Engineering
1	Replacement of the 161kV circuit breaker pointing towards Wooton Station	$ 116,143			
1	Replacement of devices for line protection and circuit breaker control associated with the 161kV Wooton Line position	$ 129,934			
2	Installation of a 138kV breaker with relay control on the low side of the 161kV/138kV transformer	$ 9,125			
2	Replacement of devices for transmission transformer protection associated with Transformer#3	$ 77,548			
3	Installation of a new three phase 161kV / 138kV spare transformer	$ 1,614,310			
7	Replacement of the motor operated air break switch and installation of a circuit switcher on the high side of Transformer#2	$ 306,481			
7	Replacement of devices for transmission transformer protection associated with Transformer#2	$ 43,056			
6	Replacement of devices for transmission transformer protection associated with Transformer#1	$ 344,496			
19	Installation of coupling capacitor voltage transformers on 69kV Bus#1	$ 123,894			
19	Replacement of coupling capacitor voltage transformers on 138kV Bus#2	$ 37,753			
19	Replacement of devices for 138kV Bus#2 protection	$ 111,168			
5	Replacement of 138kV capacitor bank and switcher BB	$ 395,602			
5	Replacement of devices for capacitor bank and switcher BB protection and control	$ 42,405			
8	Replacement of 69kV capacitor bank and switcher CC	$ 228,426			
8	Replacement of devices for capacitor bank and switcher CC protection and control	$ 36,405			
19	Installation of coupling capacitor voltage transformers on 69kV Bus#2	$ 52,690			
13	Replacement of the motor operated air break switch and installation of a circuit switcher on the high side of Transformer#4	$ 214,276			
13	Installation of a 34.5kV breaker with relay control on the low side of 138kV / 34.5kV Transformer#4	$ 107,026			
13	Replacement of devices for transmission transformer protection associated with Transformer#4	$ 61,424			
6	Replacement of existing 138kV/69kV Transformer#1	$ 1,200,000			
6	Installation of a 69kV breaker with relay control on the low side of 138/69kV Transformer#1	$ 153,417			
19	Installation of devices for 69kV Bus#1 protection	$ 261,850			
7	Replacement of existing 138kV/69kV Transformer#2	$ 1,200,000			
7	Installation of a 69kV breaker with relay control on the low side of 138/69kV Transformer#2	$ 153,417			
19	Installation of devices for 69kV Bus#2 protection	$ 180,000			
4	Replacement of devices for line protection and circuit breaker control associated with the 69kV Bonnyman#2 Line position	$ 172,000			
9	Replacement of the 69kV circuit breaker pointing towards Daisy Station	$ 105,115			

Hazard Breakdown					
Exhibit 2 Oneline ID	Description	Estimate			
		Material	Construction	Commissioning	Engineering
9	Replacement of devices for line protection and circuit breaker control associated with the 69kV Daisy line position	$ 172,000			
10	Replacement of the 69kV circuit breaker pointing towards Leslie Station	$ 105,115			
10	Replacement of devices for line protection and circuit breaker control associated with the 69kV Leslie Line position	$ 98,000			
11	Replacement of the 69kV circuit breaker pointing towards Bonnyman Station via the number one circuit	$ 105,115			
11	Replacement of devices for line pointing and circuit breaker control associated with the 69kV Bonnyman#1 line position	$ 185,000			
12	Installation of a 69kV circuit breaker connecting 69kV Bus#1 and Bus#2	$ 105,115			
14	Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Blackgold line position	$ 73,000			
15	Replacement of the 34.5kV circuit breaker towards Kenmont Station	$ 120,000			
15	Replacement of devices for line protection and circuit breaker control associated with the 34.5kV Kenmont Line Position	$ 95,000			
16	Replacement of devices for distribution transformer protection associated with Transformer#5	$ 63,000			
17	Replacement of the 12kV circuit breaker serving Hazard	$ 92,852			
17	Replacement of devices for feeder protection and circuit breaker control associated with the 12kV Hazard feeder position	$ 32,000			
18	Replacement of the 12kV circuit breaker spare	$ 72,000			
18	Replacement of devices for feeder protection and circuit breaker control associated with the 12kV spare feeder position	$ 32,000			
20	Installation of a 138 kV breaker pointing towards Beckham station	$ 120,000			
20	Replacement of devices for feeder protection and circuit breaker control associated with the 138 kV Beckham line position	$ 129,934			
7	Replacement of the motor operated air break switch and installation of a circuit switcher on the high side of Transformer#1	$ 306,481			
	Totals	$ 9,384,573	$ 6,724,685	$ 3,367,822	$ 5,592,910
					$ 25,069,990

Wooton Station					
Exhibit Order	Description	Estimate			
		Material	Construction	Commissioning	Engineering
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	$ 8,008			
B	Installation of two coupling capacitor voltage transformers on Phase 2 and Phase 3 of the 161kV bus;	$ 80,000			
C	Installation of telecommunication fiber equipment	$ 11,000			
	Total	$ 99,008	$ 43,500	$ 20,500	$ 158,124
					$ 321,132

VERIFICATION

The undersigned, Kamran Ali, being duly sworn, deposes and says he is the Managing Director of Transmission Planning, American Electric Power Service Corporation, that he has personal knowledge of the matters set forth in the foregoing responses and the information contained therein is true and correct to the best of his information, knowledge, and belief.

Kamran Ali

State of Ohio)
) Case No. 2019-00154
County of Franklin)

Subscribed and sworn before me, a Notary Public, by Kamran Ali this 27th day of September, 2019.

Notary Public

My Commission Expires May 10, 2021

VERIFICATION

The undersigned, Michael G. Lasslo, being duly sworn, deposes and says he is the Reliability Manager for Kentucky Power, that he has personal knowledge of the matters set forth in the foregoing responses and the information contained therein is true and correct to the best of his information, knowledge, and belief.

Michael G. Lasslo

Commonwealth of Kentucky)
) Case No. 2019-00154
County of Perry)

Subscribed and sworn before me, a Notary Public, by Michael G. Lasslo this 17th day of September, 2019.

Notary Public

My Commission Expires May 14th, 2022

VERIFICATION

The undersigned, Ranie K. Wohnhas, being duly sworn, deposes and says he is the Managing Director of Regulatory & Finance for Kentucky Power, that he has personal knowledge of the matters set forth in the foregoing responses and the information contained therein is true and correct to the best of his information, knowledge, and belief.

Ranie K. Wohnhas

Commonwealth of Kentucky)
) Case No. 2019-00154
County of Boyd)

Subscribed and sworn before me, a Notary Public, by Ranie K. Wohnhas this 26th day of September, 2019.

Pamela Howard
Notary Public ID# 619486

My Commission Expires 3-18-2023