

Kentucky Power Company  
KPSC Case No. 2019-00154  
Commission Staff's Post-Hearing Data Requests  
Dated February 6, 2020

**DATA REQUEST**

**KPSC PH 01** Refer to Kentucky Power's response to Commission Staff's Second Request for Information, Item 10. Provide the SAIDI and SAIFI values (with and without the major event days) for the Hazard Substation for 2019. Provide also the SAIDI and SAIFI values (without the major event days) for the Hazard Substation for 2016, 2017, and 2018.

**RESPONSE**

<b>Year</b>	<b>Excluding JMED</b>		<b>Including JMED</b>	
	<b>SAIDI</b>	<b>SAIFI</b>	<b>SAIDI</b>	<b>SAIFI</b>
2016	367.89	1.674	368.79	1.681
2017	792.15	7.809	814.84	8.251
2018	402.64	1.765	405.69	1.767
2019	210.20	1.897	210.24	1.897

Witness: Michael G. Lasslo

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**DATA REQUEST**

**KPSC PH 02** Provide a cost-benefit analysis showing the savings to be achieved by replacing and upgrading the various proposed Hazard Substation transmission elements as part of a single project rather than replacing and upgrading each transmission element in the ordinary course of operating and maintaining the Hazard Substation.

**RESPONSE**

Kentucky Power made several assumptions in preparing this response. First, the Company assumed the assets are replaced prior to failure. Failed assets that require immediate replacement can be significantly more costly due to expedited procurement costs, increased labor costs, and expedited mobilization. The second assumption was that certain assets were grouped together that would logically be replaced at the same time (for example a transformer and the protection for that transformer). The Company did not provide costs for each asset to be replaced one at a time. Third, escalation for material costs and labor over the longer period required to perform the work as 13 separate projects was not included as it would be difficult to predict how far out each of these assets would be replaced. Presumably, these costs will escalate with the market, and a 10% escalation over the time period would not be unreasonable. Finally, outages are difficult to obtain and were not factored into this exercise. The availability of outages would significantly affect when and how the work would be executed, which could increase the costs beyond what is calculated in KPCO\_PHR\_KPSC\_1\_02\_Attachment\_1.

The cost analysis presented in KPCO\_PHR\_KPSC\_1\_02\_Attachment\_1 is a highly conservative and preliminary estimate in 2020 dollars. The costs reflected in KPCO\_PHR\_KPSC\_1\_02\_Attachment\_1 could increase significantly, to upwards of \$40+ million, due to the host of uncertainties discussed above, which are not known or quantifiable. Furthermore, the multiple labor and construction mobilizations, duplicative engineering costs, and repetitive construction tasks (such as opening and closing control cable trenches multiple times on the separate projects) that would be required to execute the scope of work as contemplated in this response would be atypical for the Company from a planning and execution perspective.

The estimated \$25 million dollar cost in the application and in the Company's response to KPSC 1-9, Attachment 1 was a more developed estimate, but was subject to the risk of adjustment like all estimates. Because of the more certain nature of the \$25 million estimate, any adjustment would be substantially less than that provided in this response. In addition, because the project as proposed would be completed over a shorter period it

would not necessarily be subject to the risks associated with the assumptions described above, including the escalation for material and labor costs.

Witness: Michael G. Lasslo

Witness: Kamran Ali

Proj #	Project Scopes	One Line Identifiers From Exhibit 2 of the Application	Contract Engineering, Internal Engineering and Project Management	Material	Construction and AFUDC	Mobilization & Per Diem	Removal Costs	Total Estimated Cost
1	<ul style="list-style-type: none"> <li>· Install new three phase 161/138kV spare transformer</li> <li>· Install 161kV Circuit Breaker-M pointing towards Wooton Station</li> <li>· Install 138kV Circuit Breaker-X3 on the low side of 161kV transformer #3</li> <li>· Install line protection devices and CB controls</li> <li>· Replace devices for transformer protection</li> </ul>	1, 2, 3, 19	\$1,425,005	\$3,889,740	\$2,047,614	\$550,000	\$ 252,251	<b>\$8,164,610</b>
2	<ul style="list-style-type: none"> <li>· Install 138kV Circuit Breaker-P pointing towards Beckham</li> <li>· Install associated relays and controls</li> </ul>	19, 20	\$481,429	\$581,182	\$870,123	\$206,041	\$59,000	<b>\$2,197,775</b>
3	<ul style="list-style-type: none"> <li>· Replace the MOAB and install 138kV circuit switcher on the high side of transformer #4</li> <li>· Install 34kV Circuit Breaker-G on the low side of transformer #4</li> <li>· Replace devices for transformer protection</li> </ul>	13	\$420,748	\$326,793	\$555,563	\$131,396	\$37,000	<b>\$1,471,500</b>
4	<ul style="list-style-type: none"> <li>· Replace Capacitor Bank BB</li> <li>· Replace devices for capacitor bank and switcher BB protection and control</li> </ul>	5	\$188,268	\$379,591	\$241,021	\$95,000	\$160,000	<b>\$1,063,880</b>
5	<ul style="list-style-type: none"> <li>· Replace existing transformer #1</li> <li>· Replace the MOAB and install 138kV circuit switcher on the high side of transformer #1</li> <li>· Install 69kV Circuit Breaker-K on the low side of transformer #1</li> <li>· Replace devices for transformer protection</li> </ul>	6, 19	\$632,571	\$1,753,808	\$847,900	\$250,000	\$265,000	<b>\$3,749,279</b>
6	<ul style="list-style-type: none"> <li>· Replace existing transformer #2</li> <li>· Replace the MOAB and install 138kV circuit switcher on the high side of transformer #2</li> <li>· Install 69kV Circuit Breaker-K on the low side of transformer #2</li> <li>· Replace devices for transformer protection</li> </ul>	7, 19	\$755,977	\$2,087,553	\$1,317,120	\$300,000	\$265,000	<b>\$4,725,650</b>
7	<ul style="list-style-type: none"> <li>· Install 69kV Bus Tie Circuit Breaker-J connecting 69kV bus #1 and bus2</li> </ul>	12	\$134,289	\$113,296	\$108,209	\$45,000	\$190,000	<b>\$590,794</b>
8	<ul style="list-style-type: none"> <li>· Replace 69kV Circuit Breaker-S pointing towards Daisy Station</li> <li>· Install line protection devices and circuit breaker control</li> </ul>	9	\$161,536	\$172,417	\$216,174	\$65,000	\$50,000	<b>\$665,127</b>
9	<ul style="list-style-type: none"> <li>· Replace 69kV Circuit Breaker-E pointing towards Leslie Station</li> <li>· Install line protection devices and circuit breaker control</li> </ul>	10	\$161,536	\$172,417	\$216,174	\$65,000	\$50,000	<b>\$665,127</b>
10	<ul style="list-style-type: none"> <li>· Replace 69kV Circuit Breaker-F pointing towards Bonnyman Station</li> <li>· Install line protection devices and circuit breaker control</li> <li>· Replace line protection devices and circuit breaker control for 69kV Circuit Breaker-R</li> </ul>	4, 11	\$213,074	\$219,500	\$336,838	\$70,000	\$50,000	<b>\$889,412</b>
11	<ul style="list-style-type: none"> <li>· Replace Capacitor Bank CC</li> <li>· Replace devices for capacitor bank and switcher CC protection and control</li> </ul>	8	\$204,437	\$379,188	\$411,680	\$120,000	\$80,000	<b>\$1,195,305</b>
12	<ul style="list-style-type: none"> <li>· Replace 34kV Circuit Breaker-A,</li> <li>· Install feeder protection devices and circuit breaker control</li> <li>· Replace feeder protection devices and circuit breaker control for 34kV Circuit Breaker-B</li> <li>· Replace devices for transformer protection associated with transformer #5</li> </ul>	14, 15, 16	\$349,362	\$261,565	\$568,988	\$125,923	\$60,000	<b>\$1,365,838</b>
13	<ul style="list-style-type: none"> <li>· Replace 12kV Circuit Breaker-C</li> <li>· Install feeder protection devices and circuit breaker control</li> <li>· Replace 12kV Circuit Breaker-D</li> <li>· Install feeder protection devices and circuit breaker control</li> </ul>	17, 18	\$202,417	\$212,305	\$334,188	\$90,000	\$50,000	<b>\$888,910</b>
							<b>Total</b>	<b>\$27,633,201</b>

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**DATA REQUEST**

**KPSC PH 03** Refer to Kentucky Power's responses to the Attorney General's Initial Data Requests, Item 26, and to the Attorney General's Supplemental Data Requests, Item 7. Provide metric and report associated with the needs identification evaluation of the Hazard Substation's performance, condition, and risk for 2015 and 2016 .

**RESPONSE**

Please see KPCO\_PHR\_KPSC\_\_1\_03\_Attachment\_1 for the requested information for 2016. Information for 2015 is limited to the transformers only as the circuit breaker information is not available. Furthermore, please note the Asset Health Center software, which produces the Asset Health Transformer Scores, was not placed in service until the end of 2015. The Snapshot score taken on 8/11/15 is a score taken when the software was still in the development phase. In addition, the lower score for Transformer #4 in 2017 is a result of the replacement of that transformer when it failed in May 2017.

Witness: Michael G. Lasslo

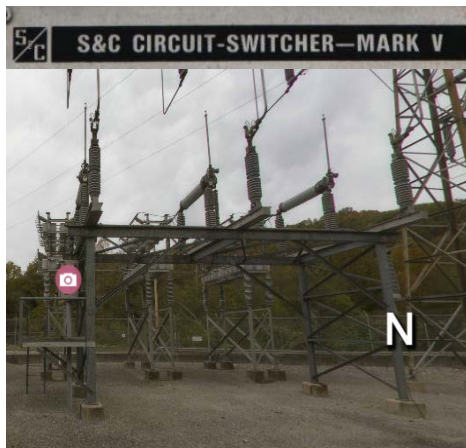
Witness: Kamran Ali



# Hazard Circuit Breakers

Circuit Breaker Health								
Owner	Name of Circuit Breaker	Interrupting Medium	Manufacturing Year	Voltage Level	Total Score*		Fault Ops	
					2016	2017	2016	2017
D	KENMONT A	Vacuum Oil	1989	34.5 kV	5.29	5.29	199	221
D	BLACKGOLD B	Vacuum	2011	34.5 kV	-6.33	-6.04	13	22
D	HAZARD C	Oil	1969	12 kV	17.1	17.1	333	354
T	LESLIE E	Oil	1974	69 kV	13.5	13.7	172	184
T	BONNYMAN #1 F	Oil	1985	69 kV	4.26	4.42	176	193
T	WOOTON M	SF6	1988	161 kV	4.45	4.60	19	21
T	BEAVER CREEK N	SF6	1988	138 kV	4.88	5.03	95	105
T	BONNYMAN #2 R	Oil	1959	69 kV	23.6	23.7	96	101
T	DAISY S	Oil	1960	69 kV	22.5	22.5	78	82
T	CIRCUIT SWITCHER BB	SF6	1993	138 kV	7.53	7.69	0	0
T	CIRCUIT SWITCHER CC	SF6	1989	69 kV	-0.86	-0.72	1	3

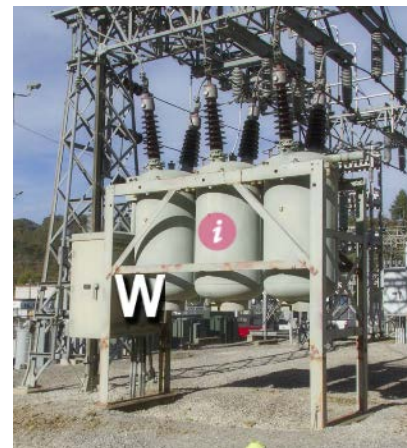
\*Total scores of 11 or above warrant immediate review and appropriate actions be taken.



138kV Circuit Switcher BB



69kV BonnymanA #2 CB R



69kV Daisy CB S



12kV Hazard CB C 1



# Hazard Transformers 1 and 2 Bank

Transformer Health						
Owner	Name of Transformer	Manufacturing Year	Voltage Level	Health Score** 2015*	Health Score** 2016	Health Score** 2017
T	1 BANK TRANSM	1973	138/69-12 kV	1.87	1.91	5.22
T	2 BANK TRANSM	1974	138/69-12 kV	0.75	1.88	3.45

\*Health score snap shots taken from 8/11/15 in the health score trend portion of the Asset Health Center software. NOTE: The Asset Health Center software, which produces the Asset Health Transformer Scores, was not placed in service until the end of 2015. The Snapshot score taken on 8/11/15 is a score taken when the software was still in the development phase.

\*\* Health scores of 3 or above warrant immediate review and appropriate actions be taken.





# Hazard Transformers 3 Bank Phases A-C

## Transformer Health

Owner	Name of Transformer	Manufacturing Year	Voltage Level	Health Score** 2015*	Health Score** 2016	Health Score** 2017
T	3 BANK A TRANSM	1941	161/138/34.5-11 kV	0.79	2.41	2.51
T	3 BANK B TRANSM	1941	161/138/34.5-11 kV	1.79	5.19	5.30
T	3 BANK C TRANSM	1941	161/138/34.5-11 kV	2.21	5.57	5.68
T	3 SPARE TRANSM	1941	161/138/34.5-11 kV	--***	--***	2.61

\*Health score snap shots taken from 8/11/15 in the health score trend portion of the Asset Health Center software. NOTE: The Asset Health Center software, which produces the Asset Health Transformer Scores, was not placed in service until the end of 2015. The Snapshot score taken on 8/11/15 is a score taken when the software was still in the development phase.

\*\* Health scores of 3 or above warrant immediate review and appropriate actions be taken.

\*\*\*Between the 2017 snapshot and today, Transformer 3 Bank Spare's status was changed to "Not in service". The Asset Health Center does not analyze transformers with a status of "Not In Service." Therefore, we are unable to produce a health score for 2015 and 2016 snapshots.



3 Bank A, B, & C





# Hazard Transformers 4 and 5 Bank

## Transformer Health

Owner	Name of Transformer	Manufacturing Year	Voltage Level	Health Score** 2015*	Health Score** 2016	Health Score** 2017
D	4 BANK*/ #4 transformer	1991 / 2011	138/34.5 kV	--***	1.33	0.80***
D	5 BANK DISTRI	1994	34.5/12kV	0.64	1.21	1.37

\*Health score snap shots taken from 8/11/15 in the health score trend portion of the Asset Health Center software. NOTE: The Asset Health Center software, which produces the Asset Health Transformer Scores, was not placed in service until the end of 2015. The Snapshot score taken on 8/11/15 is a score taken when the software was still in the development phase.

\*\* Health scores of 3 or above warrant immediate review and appropriate actions be taken.

\*\*\*4 BANK\* failed in May of 2017. Since this Transformer has been removed from service, it is no longer in the Asset Health Center Software therefore we are unable to provide a score from 2015.



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*

Michael G. Lasslo

Commonwealth of Kentucky )  
  )  
County of Perry )

Case No. 2019-00154

Subscribed and sworn before me, a Notary Public, by Michael G. Lasslo this 21 day of February, 2020.

*Ellis R. McKnight*

Notary Public

My Commission Expires JUNE 21, 2022

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*

Kamran Ali

State of Ohio )  
County of Franklin )

Case No. 2019-00154



Subscribed and sworn before me, a Notary Public, by Kamran Ali this 21<sup>st</sup> day of February, 2020.

*Linda D. Craig*

Notary Public

My Commission Expires DECEMBER 19, 2021