

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF EAST)	
KENTUCKY POWER COOPERATIVE, INC. FOR)	
A (1) CERTIFICATE OF PUBLIC CONVENIENCE)	CASE NO.
AND NECESSITY FOR THE CONSTRUCTION OF)	2022-00314
TRANSMISSION FACILITIES IN MADISON)	
COUNTY, KENTUCKY; AND (2) DECLARATORY)	
ORDER CONFIRMING THAT A CERTIFICATE OF)	
PUBLIC CONVENIENCE AND NECESSITY IS)	
NOT REQUIRED FOR CERTAIN FACILITIES)	

RESPONSES TO STAFF’S POST HEARING INFORMATION REQUEST
TO EAST KENTUCKY POWER COOPERATIVE, INC.

DATED 01/26/2023

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2022-00314

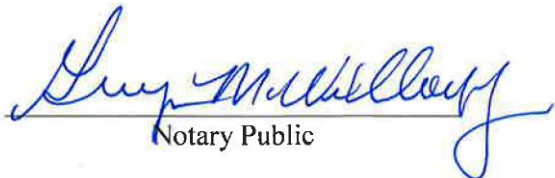
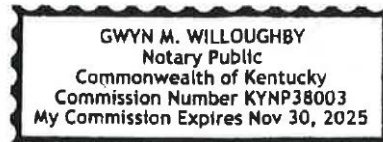
CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Darrin Adams, being duly sworn, states that he has supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Staff's Post Hearing Request for Information in the above-referenced case dated January 26, 2023, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.



Subscribed and sworn before me on this 2nd day of February, 2023.


Notary Public

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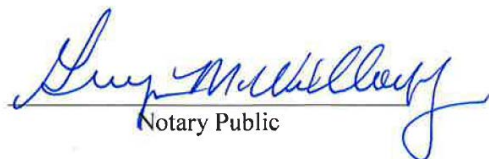
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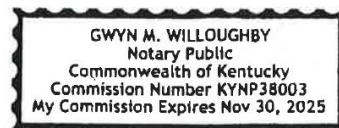
STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Laura LeMaster, being duly sworn, states that she has supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Staff's Post Hearing Request for Information in the above-referenced case dated January 26, 2023, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.



Subscribed and sworn before me on this 2nd day of February, 2023.


Notary Public



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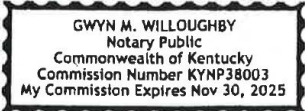
STATE OF KENTUCKY)
)
 COUNTY OF CLARK)

Lucas Spencer, being duly sworn, states that he has supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Staff’s Post Hearing Request for Information in the above-referenced case dated January 26, 2023, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.

Lucas Spencer

Subscribed and sworn before me on this 2nd day of February, 2023.

Gwyn M. Willoughby
 Notary Public



EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
POST HEARING REQUEST FOR INFORMATION RESPONSE

STAFF'S REQUEST DATED 01/26/2023

REQUEST 1

RESPONSIBLE PARTY: Darrin Adams

Request 1. Provide the most recent power flow study results indicating the thermal overloads and voltage issues that support the need for the 69 kV line rebuild and additional 138 kV circuit upgrade to the area. If not in the body of the study, include sufficient explanation such that a non-engineer can understand the study results.

Response 1. Exhibit 1-1A is a graphical depiction of the transmission system in the area in EKPC's 2022-2023 Winter peak power-flow model with all transmission facilities in service (no transmission contingencies, that is, N-0 conditions). The orange line shown is the existing Fawkes EKPC-West Berea 138 kV line. The green lines shown represent the KU Fawkes-West Berea 69 kV circuit, including all of the distribution substations (Duncannon Lane, Crooksville, Speedwell Road, Hickory Plains, PPG, Alcan #1, and Alcan #2) and associated 69 kV tap lines connected to the circuit. Power flows are shown for each line. The number shown either to the left of each line or above the line (depending on orientation on the diagram) represents the power-flow value on the line in Megavolt-amperes ("MVA"). The number shown to the right or below each line represents the power flow in terms of the percentage of the line's rating.

For example, the flow on the Fawkes EKPC-West Berea 138 kV line in Exhibit 1-1A is 117.3 MVA, which equates to 47.3% of the line's 251 MVA winter continuous rating. Bus voltage values (in both per-unit value and kV) are shown adjacent to each bus. For example, on Exhibit 1-1A, the Speedwell Road bus (in the upper right corner of the diagram) voltage value is 0.95 per-unit (i.e., 95% of rated voltage) or 65.5 kV. Load values at the distribution substations are indicated by a line with a triangle on the end. The value to the left of these load lines is the MW value of the load, and the value to the right is the MVAR (i.e., reactive component) of the load. For example, Speedwell Road has a load value of 26.9 MW and 0 MVAR on Exhibit 1-1A. This diagram indicates that with all transmission facilities in service for 2022-23 Winter peak load conditions, all voltage levels are at least 0.95 per-unit and all flows on transmission facilities are within ratings (highest flow as percentage of rating is 64.8% on the West Berea 138/69 kV transformer). Exhibit 1-1B is a report providing all power-flow results for the entire EKPC transmission system for this modeled scenario.

Exhibit 1-2A shows the same system for the single-contingency (that is, N-1) scenario with the Fawkes-West Berea 138 kV line taken out of service. This is indicated by the dashed line on the diagram, shown in the red oval. The blue circle contains the resulting flow on the KU Fawkes-Duncannon Lane 69 kV line, which is 145.2 MVA. This value is approximately 108% of the line's winter emergency rating of 134 MVA. Exhibit 1-2B is a report providing all power-flow results for the entire EKPC transmission system for this modeled scenario.

Exhibit 1-3A shows the same system for 2027-28 winter peak load conditions for the single-contingency scenario simulating an outage of the West Berea-Alcan 69 kV line. This is indicated by the dashed line on the diagram, shown in the red oval. The blue circle contains the

resulting voltage value on the Alcan 69 kV bus, which is 0.91 per-unit (62.5 kV). This value of 0.91 per-unit (91% of rated voltage) is above EKPC's minimum allowable value of 0.90 per-unit, so minimal capacity for service to additional load in the area exists. Exhibit 1-3B is a report providing all power-flow results for the entire EKPC transmission system for this modeled scenario

Exhibit 1-4A shows the same scenario (2027-28 winter peak load conditions for the single-contingency scenario simulating an outage of the West Berea-Alcan 69 kV line), but with the inclusion of an additional 3 MW of load at the Duncannon Lane 69 kV bus (as shown in the purple oval) in order to determine the maximum amount of incremental load that can be served in the area in addition to the currently forecasted loads without creating violations of EKPC's transmission-planning criteria. The blue circle contains the resulting voltage value on the Alcan 69 kV bus, which is 0.90 per-unit (62.2 kV). This value of 0.90 per-unit (90% of rated voltage) is EKPC's minimum allowable value, so addition of any load beyond 3 MW in the area would result in the Alcan bus voltage dropping below the minimum allowable level of 0.90 per-unit.

These studies illustrate that the power flows are above allowable levels and voltage values are below required levels, creating unacceptable system conditions. The addition of the Fawkes-Duncannon 138 kV transmission line is therefore needed and essential to supporting this portion of EKPC's electric transmission grid. As indicated, the current system can only support an additional 3 MW of demand beyond what is already expected in this area. EKPC is aware of at least five recent inquiries from potential customers with demand in excess of 100 MW interested in locating at the industrial site near Duncannon Lane in Richmond once the City of Richmond

entered into an option-to-purchase agreement with the landowner. The City of Richmond voted to exercise the option-to-purchase in late January 2023 for the creation of an Industrial Megasite.¹

¹ See attached Order No. 23-10 of the Board of Commissioners of the City of Richmond, Kentucky authorizing the option to purchase the Duncannon 600 acre parcel. This attachment is being filed under seal pursuant to a motion for confidential treatment.

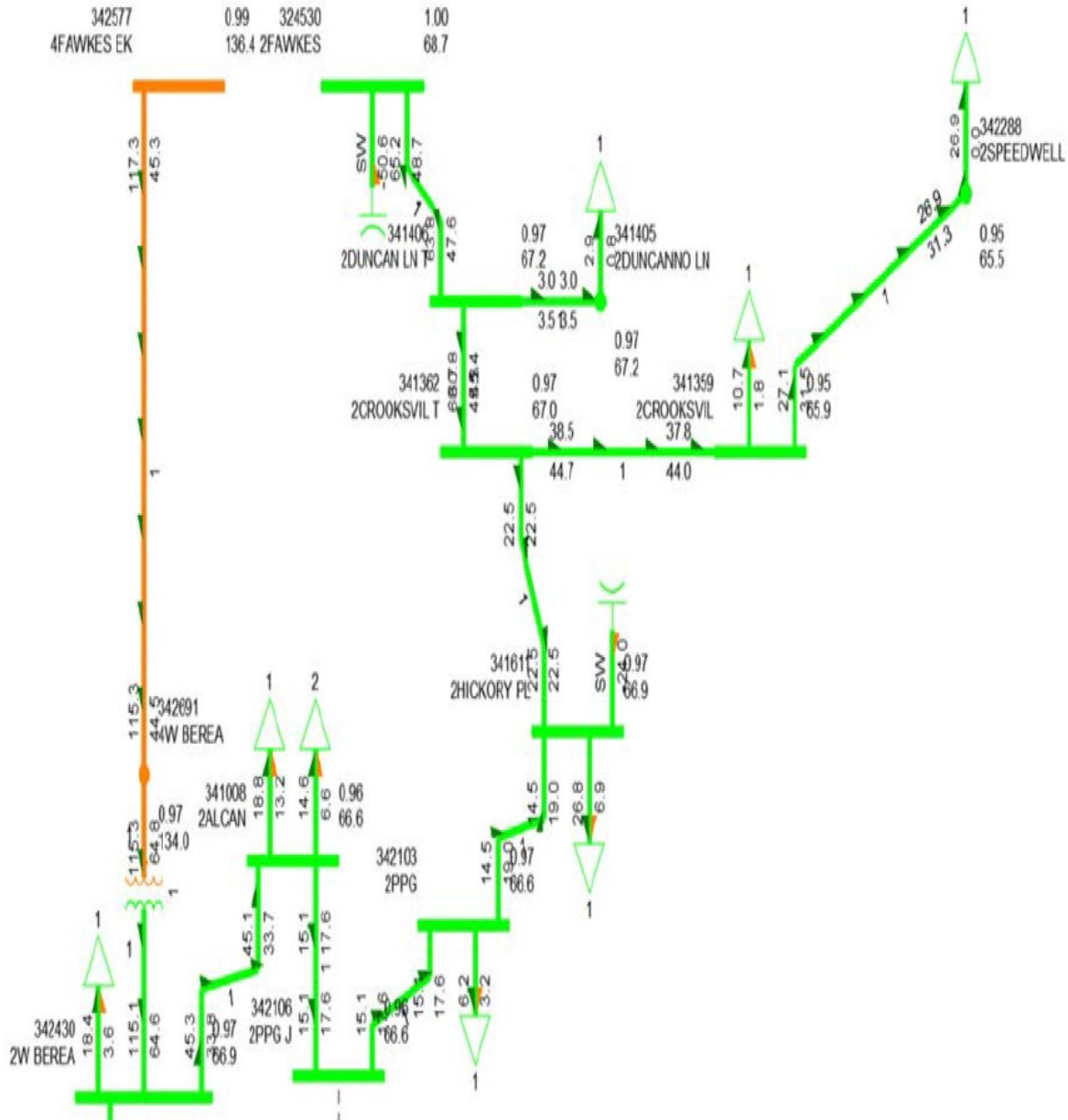


Exhibit 1-1A

EKPC Transmission System 2022-23 Winter Peak Power-Flow Model Results for
Richmond-Berea Area

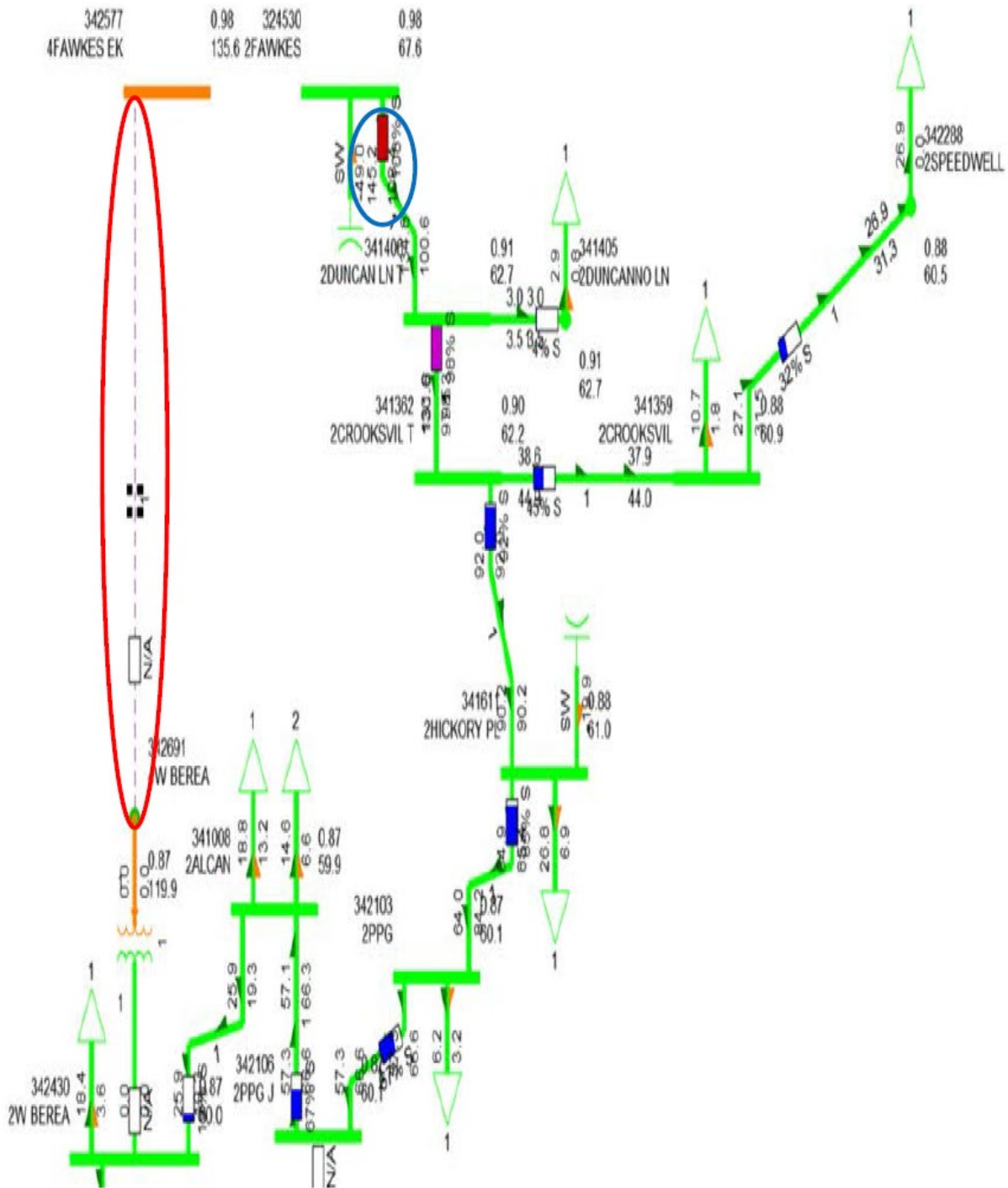


Exhibit 1-2A
EKPC Transmission System 2022-23 Winter Peak Power-Flow Model Results for
Richmond-Berea Area for Fawkes-West Berea 138 kV Line Outage

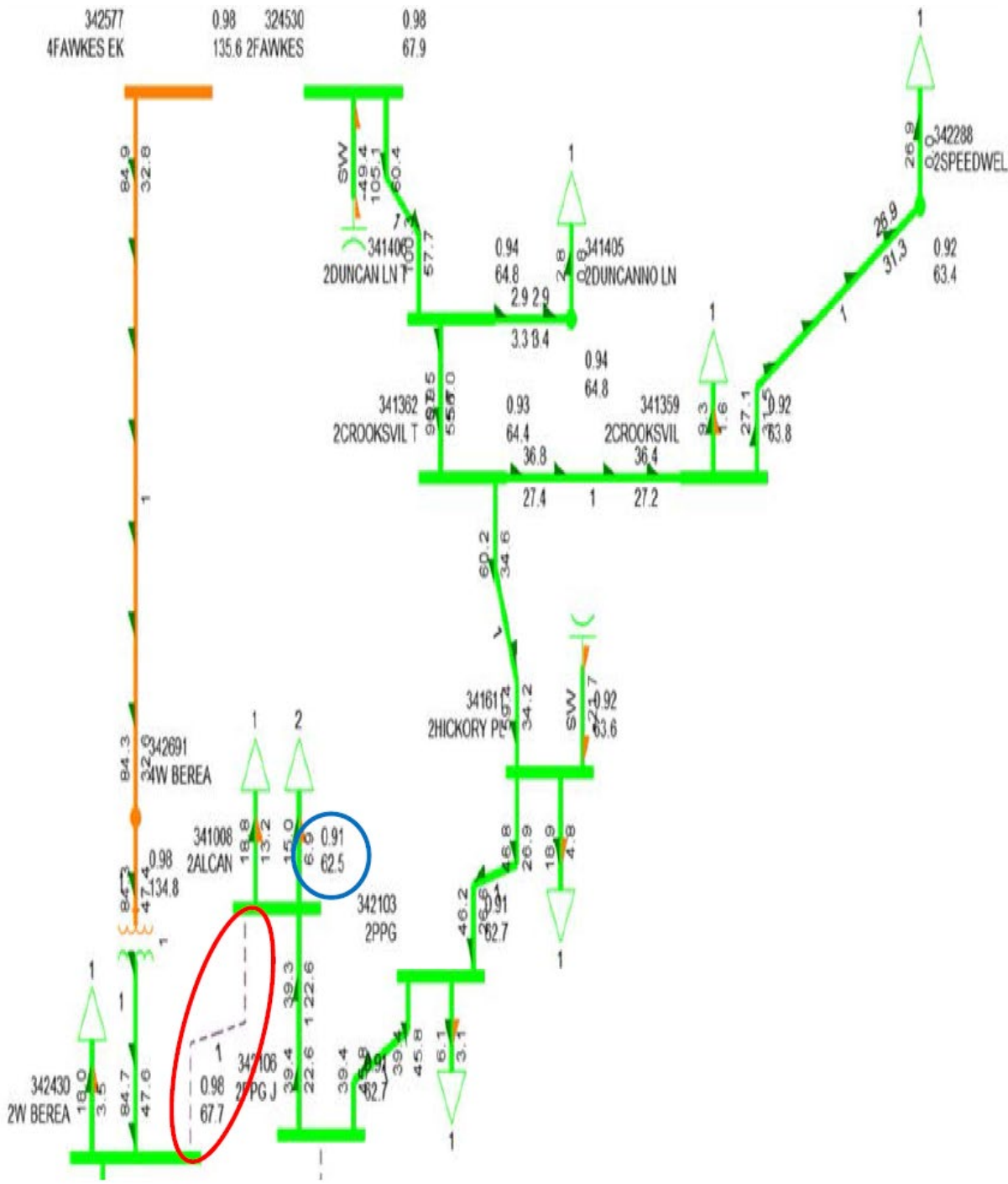


Exhibit 1-3A
EKPC Transmission System 2022-23 Winter Peak Power-Flow Model Results for
Richmond-Berea Area for West Berea-Alcan 69 kV Line Outage

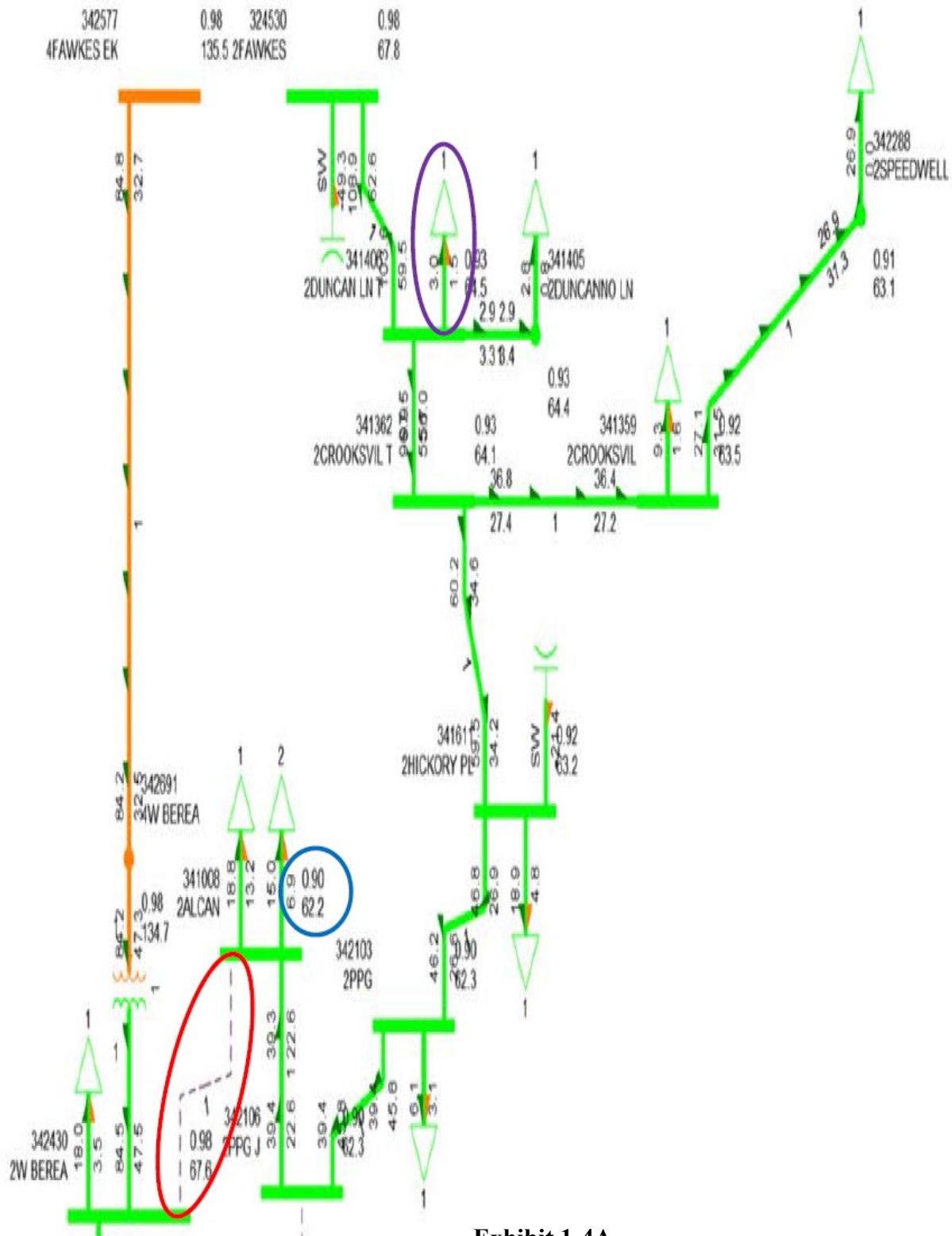


Exhibit 1-4A
EKPC Transmission System 2022-23 Winter Peak Power-Flow Model Results for Richmond-Berea Area for West Berea-Alcan 69 kV Line Outage with 3 MW Incremental Load at Duncannon Lane Substation

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
POST HEARING REQUEST FOR INFORMATION RESPONSE

STAFF’S REQUEST DATED 01/26/2023

REQUEST 2

RESPONSIBLE PARTY: Darrin Adams

Request 2. Provide the most recent load forecast for the area to be served by the 138 kV line when it is needed.

Response 2. Table 2-1 below shows the current winter season forecasts for each substation that is currently served from the Fawkes-West Berea 69 kV circuit as well as the West Berea distribution substation:

Table 2-1 ⁽¹⁾ Richmond-Berea Area Coincident Peak 50/50 Probability Load Forecast (Megawatts)									
Year (Winter Peak Season)	Alcan #1	Alcan #2	Crooksville	Duncannon Lane	Hickory Plains	PPG	Speedwell Road	West Berea	Total
2022-23	18.8	14.6	10.7	2.9	26.8	6.2	26.9	18.4	125.3
2023-24	18.8	15.0	10.7	2.9	26.8	6.2	26.9	18.3	125.6
2024-25	18.8	15.0	10.7	2.9	26.8	6.2	26.9	18.2	125.5
2025-26	18.8	15.0	9.1	2.8	18.5	6.1	26.9	18.2	115.4
2026-27	18.8	15.0	9.2	2.8	18.7	6.1	26.9	18.1	115.6
2027-28	18.8	15.0	9.3	2.8	18.9	6.1	26.9	18.0	115.8
2028-29	18.8	15.0	9.4	2.8	19.1	6.1	26.9	18.1	116.2
2029-30	18.8	15.0	9.5	2.9	19.2	6.2	26.9	18.3	116.8
2030-31	18.8	15.0	9.5	2.9	19.4	6.2	26.9	18.4	117.1
2031-32	18.8	15.0	9.6	3.0	19.5	6.3	26.9	18.6	117.7
2032-33	18.8	15.0	9.7	3.0	19.7	6.3	26.9	18.7	118.1

2033-34	18.8	15.0	9.8	3.0	19.9	6.4	26.9	18.9	118.7
2034-35	18.8	15.0	9.9	3.1	20.0	6.4	26.9	19.1	119.2
2035-36	18.8	15.0	10.0	3.1	20.2	6.5	26.9	19.4	119.9
2036-37	18.8	15.0	10.0	3.1	20.4	6.6	26.9	19.5	120.3
2037-38	18.8	15.0	10.1	3.2	20.6	6.6	26.9	19.7	120.9
2038-39	18.8	15.0	10.2	3.2	20.7	6.7	26.9	19.9	121.4
2039-40	18.8	15.0	10.3	3.2	20.9	6.8	26.9	20.1	122.0
2040-41	18.8	15.0	10.4	3.3	21.1	6.9	26.9	20.3	122.7
2041-42	18.8	15.0	10.5	3.3	21.3	7.0	26.9	20.5	123.3
2042-43	18.8	15.0	10.6	3.3	21.4	7.0	26.9	20.7	123.7
2043-44	18.8	15.0	10.7	3.4	21.6	7.1	26.9	20.9	124.4
2044-45	18.8	15.0	10.7	3.4	21.8	7.2	26.9	21.1	124.9

- (1) These coincident-peak forecast values were developed as part of EKPC's load forecast process for the Blue Grass Energy delivery point distribution substations in 2020. The load forecast file for the entire Blue Grass Energy system is attached to this Response as Exhibit 2-1.

Table 2-2 shows the actual load at each substation during EKPC's system peak, occurring on 12/23/2022 at 6:00 PM:

Date/Time	Alcan #1	Alcan #2	Crooksville	Duncannon Lane	Hickory Plains	PPG	Speedwell Road	West Berea	Total
12/23/2022 @ 6:00 PM	5.7	8.1	12.8	1.4	29.7	1.0	2.8	19.9	81.4

The Alcan #1, Alcan #2, Duncannon Lane, PPG, and Speedwell Road substations serve primarily industrial load, while the Crooksville, Hickory Plains, and West Berea substations serve primarily residential load. Comparison of the actual load values in Table 2-2 to the values in the first row of data (for 2022-23 winter) in Table 2-1 indicates that the substations serving primarily industrial load were well below expected load levels, whereas the substations serving primarily residential load experienced load levels well above expected load levels. From Table 2-2, the industrial substations (Alcan #1, Alcan #2, Duncannon Lane, PPG, and Speedwell Road) experienced a combined coincident load of 19 MW, while the combined coincident forecasted load for those substations in 2022-23 winter from Table 2-1 is 69.4 MW. Therefore, the industrial substation demand in the area was approximately 50 MW below the forecasted amount, while the residential

substation demand was approximately 6.5 MW above the forecasted amount (62.4 MW actual versus 55.9 MW forecasted). Therefore, had Winter Storm Elliott occurred during a time when the industrial facilities in the area were operating normally rather than during the Friday evening of the Christmas holiday weekend, the total coincident load experienced in the area could have been as much as 131.8 MW versus the total forecasted amount of 125.3 MW for 2022-23 Winter. Consequently, the voltage violations that have been identified in the area could have occurred during this winter-weather event under such circumstances due to the higher-than-expected load that would have been experienced.

**EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
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STAFF'S REQUEST DATED 01/26/2023

REQUEST 3

RESPONSIBLE PARTY: Darrin Adams

Request 3. Provide the most recent Federal Energy Regulatory Commission (FERC) Form 715.

Response 3. Attachment 3-1 to this response is the FERC Form 715 filing for 2022 made by PJM on behalf of EKPC. This attachment is being filed under seal pursuant to a motion for confidential treatment. Part 4 of the document specifies EKPC's transmission planning criteria applied to the EKPC transmission system generally for power-flow studies, including the study of the Richmond-Berea area that is the subject of this proceeding.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
POST HEARING REQUEST FOR INFORMATION RESPONSE

STAFF'S REQUEST DATED 01/26/2023

REQUEST 4

RESPONSIBLE PARTY: Laura LeMaster

Request 4. Provide a detailed cost estimate for creating a double circuit on the existing 138 kV Fawkes/West Berea line and creating a tap to the 69 kV line to address the voltage issues.

Response 4. Although details related to this request were somewhat unclear, EKPC has responded based on scenarios that address the physical description of the implied configuration and still meet the electrical needs of the area. EKPC is providing information regarding two routes that utilize double-circuit of the new 138 kV line with the existing 138 kV Fawkes – West Berea transmission line. The first route includes double-circuit with the 138 kV Fawkes – West Berea circuit and then extends due east from the existing 138 kV Fawkes – West Berea right-of-way to the preferred location for the Madison County Switching Station. This route is shown in Exhibit DR4-R4A. The second route included herein was shown as Route 4 in the Fawkes – Duncannon Lane Siting Report included as Exhibit 18 of the Application. The cost estimate included herein for the first route assumes a double-circuit of the 138 kV Fawkes – Duncannon Lane with the 138 kV Fawkes – West Berea transmission line (same structures). Once south of the densely populated area of 138 kV transmission line, until it

reaches the 69 kV KU Fawkes – Duncannon Lane transmission line. Once meeting the 69 kV KU Fawkes – Duncannon Lane transmission line, the remaining line would be constructed as a double-circuit 138 kV and 69 kV along the existing 69 kV right-of-way (same right-of-way for currently proposed double circuit). This route is shown in Exhibit DR4-R4B.

For the second route, EKPC provided cost information in the Staff's Second Request for Information, Item 15 and Staff's Third Request for Information, Item 7, for an Alternative route for the 138 kV Fawkes - Duncannon Lane transmission line which assumed colocation along the 138 kV Fawkes – West Berea right-of-way, and a colocation along the 69 kV Fawkes – Duncannon Lane right-of-way, following the same route as that shown in Exhibit DR4-R4B. With this alternative and the use of colocation, the cost estimate was \$19.6 million. If including the cost of \$8.5 million for the rebuild of the single-circuit 69 kV Fawkes – Duncannon Lane, the total to reconstruct the 69 kV as a single circuit and then collocate the 138 kV circuit at a later date would be a total project cost of \$28.1 million. Thus, this option would exceed the cost of the project proposed by EKPC by \$9.1 million.

Development of planning level estimates, since a preliminary or detailed design have not been completed, utilizes a per mile cost, based on voltage and length. EKPC also utilizes a cost adder for self-supporting structures, due to the additional cost associated with self-supporting structures. This is the same method utilized as part of the Routing Study completed for this project. In fact, the same cost per mile and adder per self-supporting structure were utilized for the planning

level estimate as were utilized for alternative route cost estimates in the Fawkes – Duncannon Lane Routing Study completed by NV5 Geospatial included in the Application as Exhibit 18.

The number of self-supporting structures is estimated based on engineering judgement taking into account numerous factors that would require the use of self-supporting structures. Mileage is estimated based on a high-level review, but field feasibility studies have not been completed for the routes provided. Additionally, for projects scoped to this level, it is industry accepted practice to include a minimum of 30% contingency on the project due to the level of design completed.

The table below shows the cost breakdown utilized to develop the cost estimates for the two routes described in this response to Request 4:

Preliminary Cost Estimate for Exhibit DR4-4A				
	Cost	Unit	Quantity	Total
138 kV double circuit	\$ 1,600,000	per mile	8.0	\$ 12,832,000
138 kV single circuit	\$ 1,212,000	per mile	3.1	\$ 3,805,680
Double Circuit self supporting angle > 30 deg	\$ 320,000	each	7	\$ 2,240,000
Total				\$ 18,877,680
Contingency (30%)				\$ 5,663,304
Total Project Estimate				\$ 24,540,984

Preliminary Cost Estimate for Exhibit DR4-4B				
Exhibit DR4-4B Routing Study Route 4	Cost	Unit	Quantity	Total
138 kV double circuit	\$ 1,600,000	per mile	4.8	\$ 7,712,000
138 kV single circuit	\$ 1,212,000	per mile	2.2	\$ 2,642,160
138 and 69 kV double circuit	\$ 1,600,000	per mile	4.0	\$6,384,000
Double Circuit self supporting angle > 30 deg	\$ 320,000	each	8	\$ 2,560,000

Total	\$ 19,298,160
Contingency (30%)	\$ 5,789,448
Total Project Estimate	\$ 25,087,608

The cost estimates above are only for the construction of the 138 kV circuit from Fawkes to Duncannon Lane. These cost estimates do not include the additional \$8.5 million dollars associated with rebuild of the 69 kV KU Fawkes – Duncannon Lane which will start construction in the fall of 2023.

It is also important to note that the 138 kV Fawkes – West Berea line was energized in 1992 and has been partially refurbished in the last 3 to 4 years, including the installation of new Optical Ground Wire. Demolition of the existing 138 kV Fawkes – West Berea line for replacement as a double-circuit would cause removal and replacement of a line that is not nearing the end of its service life, likely stranding assets associated with the demolition of this line.

Additionally, if EKPC were to construct the 69 kV as a single-circuit at this time, and then in the future construct the 138 kV utilizing either of the routes shown on Exhibit DR4-R4A & B, new greenfield right-of-way would be required as well as additional outages in the area.

Both alternatives shown in Exhibits DR4-R4A and DR4-R4B, would require the purchase of 56.4 acres or 40 acres respectively of new right-of-way between the 138 kV Fawkes – West Berea transmission line and the 69 kV KU Fawkes – Duncannon Lane transmission line. This additional right-of-way would add unnecessary cluttering to the landscape, and result in additional impact to landowners in the area by executing multiple construction projects, and an increase in the number of transmission structures.

As stated in Staff's Second Request for Information, Item 15, long-term outages of these circuits are problematic now and will become even more so in the future, as power demand increases in a region of hastening growth. The construction of the KU Fawkes – Duncannon Lane line will require a long-term outage. If one of the alternatives shown in Exhibit DR4-R4A and DR4-R4B were to be implemented in lieu of the currently-planned Project, additional long-term outages will be required on the 138 kV Fawkes – West Berea transmission line and the newly rebuilt 69 kV Fawkes – Duncannon Lane transmission line. In addition to being less expensive, limiting the exposure to a single outage of the KU Fawkes – Duncannon Lane line with the rebuild as a 138 kV and 69 kV double –circuit is much more conducive to maintaining reliable operation of the system.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
POST HEARING REQUEST FOR INFORMATION RESPONSE

STAFF'S REQUEST DATED 01/26/2023

REQUEST 5

RESPONSIBLE PARTY: Laura LeMaster

Request 5. Confirm that notice was sent to property owners directly affected by the proposed transmission line route and property owners within the right-of-way for each of the proposed projects.

Response 5. EKPC provided notice to the property owners within the proposed 138 kV transmission line right-of-way, including the property owner for the preferred location of the Madison County Switching Station. The list of property owners who received mailers was included in Exhibit 14 of the Application. Exhibit 15 of the Application includes information regarding the newspaper notice and publisher's affidavit. These actions comply with all state statutory and regulatory requirements for giving notice to affected landowners. EKPC has also been in communication with respective landowners regarding fee simple property acquisition of preferred properties for the New Industrial Substation, Fawkes Expansion, and the Madison County Switching Station since prior to the filing of the CPCN Application in this proceeding.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00314
POST HEARING REQUEST FOR INFORMATION RESPONSE

STAFF'S REQUEST DATED 01/26/2023

REQUEST 6

RESPONSIBLE PARTY: Lucas Spencer

Request 6. Confirm that EKPC does not intend to utilize the right-of-way or easements granted for the Fawkes/West Berea 138 kV line for the portion running parallel to the proposed 69 kV line.

Response 6. EKPC does not intend to utilize the right-of-way or easements granted for the Fawkes-West Berea 138kV line on any portion of the proposed double circuit rebuild of the Fawkes-Duncannon Lane transmission line.