

## **DATA REQUEST**

**KPSC 1\_4** Explain whether and to what extent either of the alternative solutions would remedy the specific issues being addressed by this project.

## **RESPONSE**

Assuming they can be constructed as described, the components described as Alternative Solution 1 and Alternative Solution 2 in this application would address the requirements of the project, although in a manner that is electrically not as effective as the Proposed Project, and at a higher cost compared to the Proposed Project. Please see the Direct Testimony of Company Witness Koehler for additional details. Alternative Solution 1 and Alternative Solution 2 additionally make it more likely that future upgrades in the area would be required sooner, as compared with the Proposed Project. Also, each of Alternative Solution 1 and Alternative Solution 2 would require the construction of significantly longer transmission lines, as compared with the Proposed Project.

## **September 8, 2023 Supplemental Response**

The Proposed Project is more cost effective and provides an additional source to the area, which is more robust than the capacitive support proposed in Alternative Solution 2 and the installation of a redundant source in Alternative Solution 1. Below is a comprehensive explanation as to why:

There are two fundamental needs to be addressed:

- First, a baseline voltage criteria violation identified by PJM occurs at New Camp Station under certain N-1-1 outages (N-1-1 refers to contingency where a single fault occurs, is addressed with manual recovery procedures, and a second fault subsequently occurs). The 69 kV network around New Camp Station is generally served by two sources – a 138/69 kV transformer at Johns Creek and a 138/69 kV transformer at Hatfield. When both of these transformers are out of service, there is a voltage drop violation at New Camp Station because the power is served from a very long 69 kV radial line out of Sprigg Station.
- Second, the 46 kV line between Stone and Sprigg Stations was originally constructed in 1946 and needs to be replaced (see Koehler Testimony at Page 13 for more details).

The original alternative taken to PJM in 2020 and 2021 contemplated installing a single capacitor bank at Hatfield Station to address the voltage drop violation, rebuilding the existing 46 kV line in place, and continuing to serve Belfry Station at 46 kV. At the

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time of the presentation to PJM in 2021, both the alternative and the Proposed Project would have met the above two fundamental needs. But the Proposed Project's total cost was less than the total alternative cost. Therefore, PJM reviewed and approved the Proposed Project as the best solution to address the identified needs. Once approved by PJM, the Proposed Project is built into future PJM Regional Transmission Expansion Program ("RTEP") power flow cases/models as PJM expects it to move forward through construction and to be placed in-service.

Kentucky Power subsequently received and reviewed two new customer load service requests on the 69 kV system that rendered the original alternative insufficient to address the above two fundamental needs (see the Company's response to KPSC 2\_2). The single capacitor bank at Hatfield Station would no longer address the voltage violations once the new loads were included in the RTEP power flow cases. (Had PJM approved the alternative as the best solution to address the identified needs, the Company would have had to go back to PJM for revisions. However, because the Proposed Project was approved as the best, most cost effective solution to begin with, no revisions were needed after the new load service requests came in.)

After the original application in Case No. 2022-00236 was denied by the Commission, the Company updated the alternative originally provided to PJM in 2020 and 2021<sup>1</sup> to describe more completely the next-best alternatives to the Proposed Project with its application in this case. Both Alternative Solution 1 and Alternative Solution 2 presented in this proceeding provide similar (but not as good) benefits to the Proposed Project but at a much higher cost (see the Company's response to KPSC\_1\_5).

Alternative Solution 1 proposes to rebuild the 46 kV line, continue to serve Belfry Station at 46 kV, construct a new line from Hatfield to New Camp to provide looped service (basically, looped service provides a second source to serve a station, which strengthens the reliability of the system and reduces risk of outages for customers), and install a second 138/69 kV transformer at Hatfield Station. The second transformer at Hatfield Station eliminates the voltage drop issue by introducing a redundant transformer at the location where one already exists, thus eliminating the contingency that causes the drop in the first place. However, this new transformer is not a "diverse" source, meaning that the tie to the 138 kV network is still occurring at Hatfield Station. If Hatfield Station were rendered unavailable or out of service, the same voltage issues could arise if the Johns Creek transformer were to also go out of service. For these reasons, this alternative would not be preferable to the proposed Project. See

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<sup>1</sup> The alternative had to be updated in order to account for the two new customer load service requests.

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KPCO\_R\_KPSC\_Supplemetnal\_Attachment1 demonstrating the location of the Hatfield Station where this transformer would be installed.

Alternative Solution 2 is similar to the first and proposes to rebuild the 46 kV line, continue to serve Belfry Station at 46 kV, and construct a new line from Hatfield to New Camp to provide looped service. However, instead of a second transformer at Hatfield Station, this alternative would propose to install new capacitor banks at several stations along the 69 kV line. While this may work from a technical load flow perspective, installing multiple capacitor banks in a small area is not ideal. Too many capacitor banks in the same area can lead to ‘hunting.’ Hunting refers to a situation where one capacitor bank may turn on, increasing voltages in the area. However, the capacitor turning on may cause high voltages at a different bus, thus causing a second capacitor bank to turn off. This second bank turning off may then lead to lower voltages elsewhere, causing a third capacitor bank to turn back on. In other words, the coordination of settings and capacitor banks becomes very difficult in a small area due to a cascading-type effect of turning on and off when reacting to voltage levels that are too high or too low. See KPCO\_R\_KPSC\_Supplemetnal\_Attachment2 demonstrating the location of the stations at which additional capacitor banks would be installed.

The Proposed Project proposes to retire the 46 kV line between Sprigg and Stone Stations and construct a new 69 kV line from Stone to New Camp Station. Belfry Station will be retired and replaced by Orinoco Station. The Proposed Project constructs fewer line miles overall, eliminates a portion of the 46 kV network, introduces a new, independent third source to the 69 kV network via Stone Station to mitigate the voltage drop violations, provides looped service to New Camp Station, and addresses identified asset renewal issues at Belfry Station. This third independent source (via looped service to the New Camp Station) utilizes existing 138 kV and 69 kV infrastructure at Stone Station. Therefore, the Proposed Project does not result in wasteful duplication, but rather is the most cost-effective solution to address the identified needs.

Further, for informational purposes, the Company is also providing the following explanation of the general process that would occur if a CPCN application is denied for a project that PJM has already reviewed or approved:

In general, if a CPCN is denied for a project already reviewed and/or approved by PJM, the Company would re-submit a solution to PJM for analysis and stakeholder review in a future SRRTEP meeting. PJM would remove the previously reviewed solution from their RTEP cases and insert the new solution to re-run analysis. This re-run would confirm whether the new solution still addresses all of the previously identified needs and does not cause any additional harm to the system. AEP would also need to

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provide information to stakeholders why the previously reviewed project was no longer able to move forward and why the new project is now moving forward. This would likely result in a delay in constructing the project beyond the identified in-service date. For any baseline projects, this delay would also require the Company to implement a temporary operating procedure that could result in shedding load under expected future conditions if the identified contingencies causing the baseline criteria violations were to occur in real time.

Witness: Nicolas C. Koehler



### Koehler Verification Form.doc

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 Pages: 1  
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#### E-Signature Summary

**E-Signature 1: Nicolas C Koehler (NCK)**  
 September 05, 2023 10:42:00 -8:00 [099B779B4EB4] [12.111.1104.2]  
 nckoehler@aep.com (Principal) (Personally Known)

**E-Signature Notary: Marilyn Michelle Caldwell (MMC)**  
 September 05, 2023 10:42:00 -8:00 [55DA1C64466D] [167.239.221.101]  
 mmcaldwell@aep.com  
 I, Marilyn Michelle Caldwell, did witness the participants named above electronically sign this document.



VERIFICATION

The undersigned, Nicolas C. Koehler, being duly sworn, deposes and says he is the Director of East Transmission Planning for American Electric 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.

Nicolas C Koehler  
Signed on 2023/09/05 10:42:00 -8:00

Nicolas C. Koehler

Commonwealth of Kentucky )  
  )  
County of Boyd                  )

Case No. 2023-00040

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Nicolas C. Koehler, on September 5, 2023.

Notary Public

MARILYN MICHELLE CALDWELL  
ONLINE NOTARY PUBLIC  
STATE AT LARGE KENTUCKY  
Commission # KYNP71841  
My Commission Expires May 05, 2027

Notarial act performed by audio-visual communication

My Commission Expires May 5, 2027

Notary ID Number KYNP71841

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