Duke Energy Carolinas
Response to
NCJC Data Request
Data Request No. 10

Docket No. E-7, Sub 1214

Date of Request: March 6, 2020
Date of Response: March 9, 2020

[ ] **CONFIDENTIAL**

[X] **NOT CONFIDENTIAL**

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 10-1, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning and Regulatory Support Specialist, and was provided to NCJC under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Request:

10-1. Refer to Oliver rebuttal testimony, page 48, line 18, which states "In fact, it is this oil testing along with other condition-based assessment triggers such as electrical testing and physical inspections that are the basis for which transformers are to be included in the Transformer Bank Replacement Program. Dissolved Gas Analysis (DGA)". It appears that DEC is replacing transformer banks based on information other than industry standard condition assessment.
a. Please describe in detail each additional piece of information that is used to replace transformer banks which is beyond standard industry condition assessment.
b. Provide any and all industry information which supports DECs approach to Replace Transformer Banks, using information beyond standard industry condition assessments.
c. Explain how these additional pieces of information accelerate the replacement of transformer banks over that which would be indicated by standard industry condition based assessments.

Response:

a. Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify substation transformer banks for replacement. Duke Energy employs the Health & Risk Management (HRM) analytical software to quantitatively rank the health and criticality of transformers, and this information is the feeder into the replacement program. The inputs to the HRM software include but are not limited to: oil condition/DGA, electrical test results, voltage/load factor, environmental index, customer index, and surveillance list index. Subject Matter Experts review the quantitative results and validate scoring based on other condition-based assessment inputs such as inspections competed during substations rounds. Duke Energy is actively involved in industry groups such as the North American Transmission Forum (NATF), Electric Power Research Institute (EPRI), Doble Engineering, and IEEE committees. Duke Energy is committed to not only following industry standard practices but helping to shape industry best practices.
b. N/A, as stated above, Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify substation transformer banks for replacement.
c. N/A, as stated above, Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify substation transformer banks for replacement.

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The attached response to NCJC Data Request No. 10-2, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning and Regulatory Support Specialist, and was provided to NCJC under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

Request:

10-2. Refer to Oliver rebuttal testimony, page 49, line 14, which states "Duke Energy does inspect and test substation circuit breakers to determine their health and maintenance needs. This program is the primary feeder into the prioritization and sequencing of oil breaker replacements. All oil circuit breakers proposed for replacement in the GIP have been selected based on these criteria, and each represent a potential reliability threat to our customers." This statement would indicate that beyond the "primary feeder into the prioritization and sequencing of oil breaker replacements" there would be secondary feeds into "the prioritization and sequencing of oil breaker replacements".
a. Please describe in detail each additional piece of information that is used to replace oil breakers, which is beyond standard industry condition assessment.
b. Provide any and all industry information which supports DECs approach to Replace Oil Breakers, using information beyond standard industry condition assessments.
c. Explain how these additional pieces of information accelerate the replacement of Oil Breakers in advance of that which would be indicated by standard industry condition-based assessments.

Response:

a. Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify oil circuit breakers for replacement. As described in NCJC Data Request 8-10, condition inputs to circuit breaker health include number of fault operations, number of total operations, time since previous maintenance, operational testing results, and physical testing results. Subject Matter Experts review this data regularly and provide recommendations into the work plan on the most effective course of action to address reliability threats, which may include preventive maintenance, corrective maintenance, or replacement. Since all substation oil breakers are obsolete it is not always feasible or practical to replace subcomponents, especially when the breaker is already past its end of useful life; in these cases replacement is recommended as part of the upcoming work plan. Duke Energy is actively involved in industry groups such as the North American Transmission Forum (NATF), Electric Power Research Institute (EPRI), Doble Engineering, and IEEE committees. Duke Energy is committed to not only following industry standard practices but helping to shape industry best practices. Duke Energy plans to migrate circuit breaker health and risk monitoring into the HRM program for these reasons, which will allow a more quantitative approach to be adopted for condition assessment, which would be considered an industry best practice.
b. N/A, as stated above, Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify oil circuit breakers for

replacement.
c. N/A, as stated above, Duke Energy does not use any information that is considered beyond standard industry condition assessment to identify oil circuit breakers for replacement.

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The attached response to NCJC Data Request No. 10-3, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning and Regulatory Support Specialist, and was provided to NCJC under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Request:

10-3. Refer to Oliver rebuttal testimony, page 47, line 21, which states "Further, we also do not agree with witness Stephens depiction of DE Carolinas system protection scheme and viable alternative actions to address the issue of upstream momentaries associated with faults in TUG areas. His recommendation would in fact increase sustained outages for our customers and accelerate damage to transmission and distribution equipment from fault current."
a. Provide a list of DEC transmission and distribution equipment which had to be replaced due to damage from fault current from 2015 to 2019 inclusive, as well as the cost associated with each such replacement.
b. Using the same "cost of service interruptions" data DEC used throughout GIP benefit-cost analyses, provide any workbooks, spreadsheets, analyses, or other documentation which estimates the present value cost of the "increase (in) sustained outages for our (downstream) customers" over 30 years if the system protection scheme depicted by witness Stephens were to be employed for the proposed targeted undergrounding areas.
c. Provide the 30-year benefit-cost analysis DEC completed which estimates the benefits and costs of the system protection scheme and viable alternative actions witness Stephens depicted.

Response:

The requested documents have not been created.
Witness Stephens suggests in his filed testimony that a more cost-effective, viable option to reduce momentary outages to upstream customers associated with faults in TUG areas would be to remove the fast-trips from upstream reclosers & breakers. This action would increase sustained outages for all customers downstream of these reclosing devices and increase the damage to distribution and transmission equipment/facilities. This damage would be caused by increasing the duration of large fault currents on the system. No analysis is needed to validate this fact as it is commonly understood.

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The attached response to NCJC Data Request No. 10-4, was provided to me by the following individual(s): Karen Ann Ralph, Lead Planning and Regulatory Support Specialist, and was provided to NCJC under my supervision.

Camal O. Robinson
Associate General Counsel
Duke Energy Carolinas

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Request:

10-4. Refer to Oliver rebuttal testimony, page 47, line 7, which states "Using a CBA comparison to evaluate between replacing these facilities with a brand-new antiquated design basis (rear lot overhead) from decades ago versus rebuilding with modern, updated and standard underground design represents modernization of antiquated infrastructure. This approach greatly increases the benefit to cost ratio from the statistics cited by Witness Stephens." Provide all calculations and workpapers which shows that "replacing these facilities with a brand-new antiquated design basis (rear lot overhead) from decades ago versus rebuilding with modern, updated and standard underground design represents modernization of antiquated infrastructure" "greatly increases the benefit to cost ratio from the statistics cited by Witness Stephens."

Response:

The Company's CBAs and associated work papers have been provided in Oliver Exhibit 7 and include operational savings and customer benefits as compared to the costs of replacing legacy overhead facilities with today's standard neighborhood infrastructure (underground). The study Witness Stephens refers to states the following:
"The purpose of this study is to expand on research by Larsen et al. (2015) by systematically evaluating a policy that requires investor-owned utilities (IOUs) to bury all existing and future transmission and distribution lines underground."
What the Company is proposing is significantly more narrow and selective than the complete undergrounding of all Transmission and Distribution equipment. It in fact focuses on those portions of the distribution grid that are the most inexpensive to convert, and because of the CBA framing, hand picks in a data driven way only those areas that drive the most operational cost savings and the most customer benefits. The Company would in fact agree with the summary implications of the study- that it is not cost effective to attempt to underground all transmission and distribution infrastructure. The study's focus is not similar to the Company's targeted underground program. The study also monetizes aesthetic benefits that the Company's CBAs did not include.
The study does suggest in its conclusions that targeting would yield better results, but still sticks with a framing that focuses on undergrounding all transmission and distribution facilities in a broad geographic area (urban areas). The Company believes its approach to targeted undergrounding is more appropriate and stands by its more narrow, focused and selective approach.