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VIA ELECTRONIC FILING

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
430 North Salisbury Street
Raleigh, North Carolina 27603

*RE: Response to Commission Request for Remediation Information
Docket No. E-100, Sub 101*

Dear Ms. Dunston:

Pursuant to Ordering Paragraph 2 of the Commission's *Order Clarifying Generator Interconnection Standards, Requesting Comments, and Requiring Filing of Remediation Information* (the "Order"), Duke Energy Carolinas, LLC and Duke Energy Progress, LLC hereby file the attached *Response to Commission Request for Remediation Information* with the Commission.

Please do not hesitate to let me know if you have any questions.

Very truly yours,

/s/ E. Brett Breitschwerdt

EBB/sbc

Enclosure

cc: Parties of Record

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of) DUKE ENERGY CAROLINAS, LLC’S
Petition for Approval of Revisions to) AND DUKE ENERGY PROGRESS, LLC’S
Generator Interconnection Standards) RESPONSE TO COMMISSION REQUEST
) FOR REMEDIATION INFORMATION

RESPONSE TO COMMISSION REQUEST FOR REMEDIATION INFORMATION

I. Introduction and Background

This 2021 DEC and DEP Uninspected Facilities Remediation Report (the “Remediation Report”) is being filed by Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP” and together with DEC, the “Companies” or “Duke”) in response to Ordering Paragraph 2 of the North Carolina Utilities Commission’s (“NCUC” or the “Commission”) October 8, 2021 *Order Clarifying Generator Interconnection Standards, Requesting Comments, and Requiring Filing of Remediation Information* (the “Order”). The *Order* directed Duke to “file a report detailing the status of remediation efforts at the 65 generating facilities that have been inspected by Advanced Energy (“AE”) within 60 days of the date of this Order.” The Remediation Report details the Companies’ efforts from 2014 to present day to address issues identified during AE’s Inspection of Generating Facilities located in North Carolina.

II. 2014-2015 Photovoltaic Interconnection Assessment

In 2014 and 2015, the Companies contracted AE to perform a photovoltaic (“PV”) interconnection assessment at selected operational PV facilities in the DEC and DEP service territories (the “2014-2015 Assessment”). The primary purpose of conducting the 2014-2015 Assessment was to better understand potential grid reliability issues and impacts arising at solar PV Generating Facilities that had previously interconnected to the Companies’ distribution grid. As part of the 2014-2015 Assessment, AE visited and inspected 63 Generating Facilities in DEC and DEP, including 15 PV facilities in 2014, and 48 PV facilities in 2015. The inspections performed as part of the 2014-2015 Assessment evaluated the following:

- Whether inverters, transformers, and interconnection equipment installed adhered to the relevant specifications set forth in the Interconnection Request on file with Duke;
- Whether interconnection protection settings adhered to the relevant specifications set forth in the Interconnection Agreement on file with Duke;

- Whether transformer vector group and grounding complied with inverter manufacturer recommendations; and
- Obvious or significant National Electrical Code (“NEC”) violations at inverter and interconnection equipment locations.

Assessment of the medium voltage (“MV”) construction quality and National Electrical Safety Code (“NESC”) compliance was not within the scope of the 2014-2015 Assessment.

AE presented findings and conclusions from the 2014-2015 Assessment to Duke, the North Carolina Sustainable Energy Association (“NCSEA”), and the NCUC in 2015 and 2016. AE’s findings from the 2014-2015 Assessment included the following issues of concern at inspected sites:

- As-built Generating Facility configurations did not match what was studied and approved;
- Inverter settings did not match Duke’s requirements or IEEE Std 1547;
- Open-phase detection (IEEE Std 1547 requirement) had not been verified by field tests; and
- Significant violations of the NEC existed.

Given that the purpose of the 2014-2015 Assessment was to generally understand grid reliability risks, AE did not prepare inspection reports for any individual Interconnection Customer. However, because these facilities qualify as Uninspected Facilities as contemplated by the Commission’s Order, the Interconnection Customers are now required to develop self-inspection programs to be memorialized in memoranda of agreement (“MOAs”) with Duke on or before February 1, 2022. As further addressed in Section V below, Duke expects that any issues not already remediated by the Interconnection Customers will be documented and addressed as part of the self-inspection obligations that will be undertaken pursuant to the MOAs.

III. 2016-2019 Remediation Efforts

In early 2016, multiple power quality and reliability events, reported to the Commission in the Companies’ September 22, 2016 filing in this docket, triggered a parallel effort to investigate MV construction quality and code compliance issues associated Generating Facilities in operation. At that time, Section 6.5 of the North Carolina Interconnection Procedures (the “NCIP”), effective as of May 5, 2015, permitted utilities to witness the commissioning test for an Interconnection Customer’s installed equipment. However, the NCIP did not clearly address whether utilities could mandate commissioning tests and recover the cost of performing the tests. Further, the NCIP did not include guidance on the Utilities’ performance of periodic inspections at operational Generating Facilities and there was no commonly accepted utility practice that would allow the Companies to sufficiently address the 2014-2015 Assessment findings in early 2016.

As a result of the 2014-2015 Assessment findings and the power quality and reliability events that occurred in early 2016, Duke took the following actions to improve the interconnection process beginning in 2016:

1. Duke worked with stakeholders to incorporate the following requirements into the North Carolina Interconnection Agreement (the “NC IA”) template:
 - a. MV inspections must be performed before DEC and DEP permit Generating Facilities to operate;
 - b. DEC and DEP will provide Interconnection Customers with access to the Duke’s Distribution Construction Standard; and
 - c. Interconnection Customers must build MV facilities using Duke’s Distribution Construction Standard as the minimum standard.
2. The Companies partnered with AE in 2016 to establish a pilot program dedicated to establishing a more robust inspection and commissioning program for all new utility-scale solar Interconnection Customers. The program included the MV inspection, IEEE 1547 cease-to-energize test (often called anti-islanding test by the industry), and an inverter settings check. The program was officially implemented in March 2017. Since launching the pilot program, AE has served as the sole source contractor for Duke and has performed the inspection and commissioning test at new utility-scale PV facilities (\geq 1MW) connecting to Duke’s distribution system. Since March 2017, more than 200 Generating Facilities totaling over 800 MW interconnecting to the DEC and DEP distribution systems have been inspected under this program.
3. Duke led the effort to form the Technical Standard Review Group (the “TSRG”) for industry and regulatory stakeholders to discuss technical and policy topics associated with the interconnection process. A quarterly meeting series with all TSRG members and guest speakers began in April 2018 and continues to provide an effective forum to address technical standards and other issues with the industry. The minutes and presentations from all quarterly meetings can be found on Duke Energy’s TSRG website.¹
4. Through an AE facilitated stakeholder process, the 2019 NCIP revision expanded Section 6.5 to allow for the following inspection activities:
 - a. Inspection of the MV AC side of each Generating Facility prior to, and periodically after its operation;
 - b. Utility authorization to inspect Generating Facilities that have not been inspected at the time of interconnection, and;

¹ Carolinas TSRG Updates, <https://www.duke-energy.com/business/products/renewables/generate-your-own/tsrg>, last visited Dec. 7, 2021.

- c. Inspection of a Generating Facility upon identifying issues related to safety, power quality, and reliability.

IV. 2018-2019 Interconnection Assessment

In 2018 and 2019, Duke contracted AE to inspect selected solar PV facilities focusing on MV voltage construction quality and NESC and NEC code compliance (the “2018-2019 Assessment”). The primary purpose of the 2018-2019 Assessment was to evaluate potential safety, power quality, and reliability risks that may result from permitting a Generating Facility to operate without requiring initial, pre-operation or subsequent periodic inspection. As part of the 2018-2019 Assessment, AE inspected a total of 9 Generating Facilities, ranging in capacity from 2 to 5 MW and that entered service from 2012 to 2015 without inspection. The inspections performed as part of the 2018-2019 Assessment evaluated the following:

- Generating Facilities construction quality;
- Inverter settings; and
- Expected vs. installed interconnection equipment.

In addition, AE conducted cease-to-energize tests on five Generating Facilities inspected in 2019 (cease-to-energize tests were not included in the scope of inspections for the four Generating Facilities inspected in 2018).

AE prepared inspection reports sealed by a professional engineer (“PE”) for each of the 9 inspected Generating Facilities, and Duke shared the inspection reports with Interconnection Customers for each of the 9 Generating Facilities. While the findings from the 2018-2019 Assessment suggested the need for inspection at previously uninspected Generating Facilities (“Uninspected Facilities”), a defined process to address potential issues impacting approximately 300 Uninspected Facilities was not identified as part of this effort. Duke did not require formal documentation from the inspected Interconnection Customers to confirm whether any remediation action had been taken in response to the AE inspection reports. As described above, Duke expects that any issues not already remediated by the Interconnection Customers will be addressed as part of the self-inspection obligations that will be set forth in the MOAs between Duke and each Interconnection Customer.

V. 2020-2021 Solving for Uninspected Facilities

Since the first quarter of 2020, Duke has pursued a collaborative effort through the TSRG to explore potential approaches to inspection of Uninspected Facilities. As a result of 20-months

of engagement and discussion on this topic by industry stakeholders through the TSRG and activity in this docket, DEC and DEP are now making reasonable efforts to follow the Commission's October 8, 2021 *Order* requiring them to work with Interconnection Customers with Uninspected Facilities to develop self-inspection programs and memorialize such programs in MOAs or to commit to a Duke Energy-approved third party administered self-inspection option. To the extent any Interconnection Customer subject to the Order fails to execute an MOA by the February 1, 2022 deadline set by the Commission, Duke will perform inspections using a Duke Energy-Approved Third Party-Administered Inspection Program. Although these agreements have not been finalized with any Interconnection Customer, Duke is proposing to include provisions in the MOAs that would require or otherwise ensure appropriate remediation of identified issues at Uninspected Facilities.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Response to Commission Request for Remediation Information, as filed in Docket No. E-100, Sub 101, was served via electronic delivery or mailed, first-class, postage prepaid, upon all parties of record.

This, the 7th day of December, 2021.

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