



**NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION**

January 6, 2022

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

Re: Docket No. M-100, Sub 163 – Investigation Regarding the Ability of Carolina’s Electricity, Natural Gas, and Water/Wastewater Systems to Operate Reliably During Extreme Cold Weather

Dear Ms. Dunston:

Please find enclosed for filing the Public Staff’s Data Request No. 2 – Questions on Winter Storm Elliott to Duke Energy Carolinas, LLC and Duke Energy Progress, LLC.

Please do not hesitate to contact me with any questions.

Sincerely,

Electronically submitted
/s/ Lucy E. Edmondson
Chief Counsel, Public Staff
lucy.edmondson@psncuc.nc.gov

cc: Parties of Record

Attachment

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Duke Energy Carolinas, LLC and Duke Energy Progress, LLC
Docket No. M-100, Sub 163
Public Staff Data Request No. 2 – Questions on Winter Storm Elliott
Date Sent: January 6, 2023
Requested Date Due: January 17, 2023

Public Staff Technical Contact: Dustin Metz
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Public Staff Legal Contact: Lucy Edmondson
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This data request is being filed in the docket. Please file your responses to this data request in the docket as well so that the Commission and other parties have access to the responses.

Please provide responses to this request in a searchable native electronic format (e.g., Excel, Word, or PDF files). If in Excel format, please include all working formulas. In addition, please include: (1) the name and title of the individual who has the responsibility for the subject matter addressed therein; and (2) the identity of the person making the response by name, occupation, and job title.

Please respond to each of the following questions separately for Duke Energy Carolinas, LLC, and Duke Energy Progress, LLC.

Topic: Winter planning and system preparedness

1. Provide a general description and list of the Company's policies and procedures for routine winter preparedness.
2. Identify and describe the Company division, department, staff, etc. responsible for completing the winter preparedness checklists.
 - a. Please describe how the Company performs quality control and verifies through secondary or independent means that all steps are completed/reviewed and accurate.

- b. Provide each of the completed checklists (or equivalent) for each generation plant and associated infrastructure for each year from 2020 winter preparedness to present, as well as:
 - i. the date the checklist was completed;
 - ii. the party/entity who signed off on the completed checklist;
 - iii. the parties/entities who reviewed the checklist; and
 - iv. a list and description of any open or outstanding checklist items that were not completed and how the open item could impact the reliability of the equipment/component/plant.
3. Is the Board of Directors of the Company or Duke Energy Corporation (Board), any committee of the Board, or the Senior Management Committee briefed on: (1) winter preparedness; and (2) whether any open or outstanding items may impose a risk to system reliability. If so, when did the last briefing occur?
 - a. Does the Company consider or classify December 2022 as part of its 2022 winter preparedness or 2023 winter preparedness? Please explain how the Company makes this determination.
 - b. If the Board, any committee of the Board, or the Senior Management Committee was briefed in 2020 regarding its 2021 winter preparedness, in 2021 regarding its 2022 winter preparedness, and/or in 2022 regarding its 2023 winter preparedness, please provide any associated Board/committee materials (e.g., Power Point, memo, email, document, etc.) and workpapers and supplemental information used in the creation of the Board/committee materials.

Storm planning and restoration from storm related outages

4. Please describe the Company's typical actions and planning for an anticipated winter storm.
5. Please describe the Company's typical actions and planning for an anticipated high wind event. To the extent possible, please note the differences in actions and planning for a hurricane/tropical storm with high winds versus a storm with straight-line winds (e.g., the storm that occurred during December 2022, Derecho, etc.)
6. Provide a timeline, from December 19, 2022, through December 25, 2022, of the Company's actions related to the pending winter weather event. The timeline should include, at a minimum, sufficient detail of the Company's internal processes and actions taken in advance of the pending weather event.
 - a. Provide the daily weather forecasts that were produced internally by the Company and/or by vendors/contractors, including system average temperature, wind speeds, wind chills, dew points, and supporting documentation.
 - b. Include key communications with fuel suppliers and fuel availability.
 - c. If not already provided in response to prior questions, identify pertinent information related to the Company's decision making based on information it received from or provided to operations/planners/management/specific generation units (e.g., changes in weather, wind speed, timing of the storm, locational impacts, load/demand impacts, etc.).
7. How was the Company making preparation for storm recovery given the pending holiday weekend?

- a. Provide all general internal memos or general bulletin announcements from business unit leaders, senior managers, and vice presidents to divisions or division leads of the Company advising of the potential storm, the need for staff, and requests to work through the holiday, voltage conservation, along with the dates of these communications.
 - b. In regard to the planning, preparation, and recovery actions for the transmission and distribution system from the pending and known wind and extreme low temperature events, please discuss and provide a timeline of the Company's notifications and requests for field work support from neighboring utilities, contractors, or other Duke affiliates for system restoration-related work.
 - i. Provide a list of all communications in which the Company requested support from other utilities, affiliates, contractors, etc., as well as the dates and times of the communications and the parties to the communications.
 - ii. If the Company did not request supplemental or field support for storm restoration from other utilities, affiliates, contractors, etc., please explain why.
8. Provide a timeline beginning when the system started to experience storm related outages and general restoration through midnight December 26, 2022, in 15-minute increments, including but not limited to:
- a. number of customers without service;
 - b. number of customers restored;

- c. estimated system load/demand that was lost due to customers being without service; and
 - d. general map or other locational guidance showing how the storm was impacting the overall system by circuit or by number of customers per county and state.
- 9. For the last five years, list annually by county and utility service territory the number of internal transmission and distribution craft employees (or equivalent titles and designations) that the Company has available and employed.
 - a. Please list the total number of equivalent deployable work crews.
- 10. For the last five years, list annually by county and utility service territory the number of external (contractor) transmission and distribution craft employees (or equivalent titles and designations) that the Company has utilized (represented in full time equivalent employees).
- 11. Please describe how the Company's internal transmission and distribution craft employees are deployed when a storm or winter weather event occurs, including any impacts to the total number of deployable work crews.
- 12. Please provide the work hour limits and fatigue rules in place for Duke internal and external line crews, as well as the hours that may be worked consecutively, including rolling daily averages.
 - a. Describe how the Company enforces the fatigue rules.
- 13. Please describe the actions and staffing that occurs at generation plants when a known winter storm or weather event is pending.

- a. For each generation plant, how were staff notified of the pending December 2022 storm, the actions they needed to complete in advance, and general staffing requirements?

Lead-up to December 2022 cold weather event

14. On a daily basis, beginning December 19, 2022, describe how the Company viewed the pending storm from both a wind and outage event and then followed by a cold weather event.
15. Please discuss how the Company was preparing for and forecasting cold temperatures and system responses compared to its responses to the 2014 and 2015 polar vortexes prior to the beginning of the cold weather event, including daily updates.
 - a. Were the predicted peak loads performed in-house? Please describe the predictive methods employed in 2014 and 2015 versus today.
 - b. Discuss similarities between the December 2022 cold weather event versus those of the 2014 and 2015 polar vortexes, including whether the prior cold weather events had both a storm component (wind event that contributed to outages) in addition to the extreme cold weather events.
 - c. Explain the complications, from a system operational standpoint, that occurred during this event compared to the 2014 and 2015 polar vortex events. Please include a discussion of the challenges of the storm restoration efforts versus load reduction efforts.

16. Please discuss how the Company was coordinating or prioritizing storm (wind) restoration efforts versus cold weather restoration efforts.

December 2022 cold weather event

17. Identify the actual hourly loads observed for December 24, 2022. This response should include a timeline of the long-range load forecast, the seven-day ahead forecast, the three-day ahead forecast, and the day-ahead forecast showing the loads that the Company was anticipating prior to December 23, 2022, through December 28, 2022. In the Company's response, please distinguish between retail loads, firm wholesale loads, and total balancing area loads.
18. Please provide graph(s) and supporting data that illustrate the following, at a minimum: load; aggregate Duke owned generation; imports; exports; frequency; and ACE from December 23, 2022, through December 28, 2022, with DEP East, DEP West and DEC specific information in as granular periods as possible, but no less than hourly. (Note: Individual graph(s) or a composite of graph(s) may be provided to illustrate key elements that were taking place during the period in question.) Please provide as granular information as the historian (data recorder) allows, as ACE, frequency, and generation information will likely be more granular than hourly intervals.
- a. Please provide any other key values the Company believes appropriate to illustrate system conditions and monitoring related to the real time operations and balancing of the BES, include supporting data.

19. For the period December 23, 2022, through December 26, 2022, provide a general timeline in 5-minute increments showing changes in, but not limited to: (1) day ahead and hourly load forecasts; (2) notifications to other utilities or other regulatory agencies; (3) unit generation availability; (4) power purchases; power sales; firm or non-firm purchases/sales; (5) fuel source availability, notifications from fuel source suppliers or shippers of fuel constraints or fuel deliverability restrictions; (6) transmission system constraints; (7) curtailment, notification to interruptible customers; (8) notifications of blackouts (actual notifications that blackouts where in process, not that they were a possibility); (9) DSDR activation, DSM activation; (10) power flows via the joint dispatch agreement between DEC and DEP; and/or (11) any other topic that would provide context to how the Company was informed as the situation was unfolding.
20. In regard to generation unit availability, unit tripping, load shedding, and load exceeding predicted demand, provide dates and times of meetings, emails, discussions, and other communications in which decisions were made, as well as a list of all persons participating in decision making, including their job titles.
21. From December 23, 2022, through December 26, 2022, please provide generation from each Company asset, purchase, and aggregated QFs in five-minute intervals.
 - a. Please include the primary fuel source used for each unit's generation in each time interval. To the extent the fuel source used from power purchases is unknown, please provide the Company's base assumption of fuel use.

22. Please provide the following unit outage information:
- a. A list of units that that were known to be unavailable going into December 23, 2022.
 - b. A list of units that were expected to be online or available but failed or failed to respond when called upon from December 23, 2022, through December 28, 2022.
 - c. A list of units that underperformed or were derated (energy production below expected output) from December 23, 2022, through December 28, 2022.
 - i. A list of the de-rate amount in MWs and the dates and hours impacted for each unit and or power purchase.
23. For DSDR, DSM, IVVC, and Load Reduction programs, please provide:
- a. A list of programs and their respective MW reduction that were called upon from December 23, 2022, through December 28, 2022. Include the date, hour(s) of activation, and MW reduction;
 - b. A list of programs and their respective MW reduction amount that were expected to be online or available, but failed to respond when called upon from December 23, 2022, through December 28, 2022; and
 - c. A list of programs that underperformed.
 - i. The underperformance amount in MWs and the hours impacted for program.
24. For all units/resources/programs that failed to perform, perform as expected, or perform at full nameplate potential from December 23, 2022, through December

28, 2022, please provide: (a) the time at which they failed/tripped/derated; (b) period of time associated therewith; (c) the root cause of the failure/trip/derate or most likely suspected cause; and (d) amount of lost generation at each unit.

25. Fuel and Fuel supply from December 23, 2022, through December 28, 2022:
- a. Describe the Company's understanding of the status of the natural gas supply before and during the event period for: (a) Transco; (b) suppliers/marketers; and (c) LDCs.
 - b. Were there natural gas supply or pressure issues? If so, what were they?
 - c. Was the Company notified by natural gas LDCs, Transco, suppliers/marketers, etc. of potential natural gas supply or pressure issues? If so, please provide a general timeline of the notifications and what Duke did in reaction to the notifications.
 - d. For each of the Company's natural gas generators, please provide a sub hourly log of the incoming natural gas pressures and the limits/tolerances of natural gas supply pressure. (Note: The Company may provide more granular time series to illustrate if any pressure issues or pressure variations occurred.)
 - e. Provide the commodity prices being used during this period and supporting information from source data. Values should be expressed in \$/MMBTU or equivalent \$/MWh with specific unit heat rates applied.
 - f. Provide a general summary of how Company-owned solar facilities operated during the event period, as well as forecasted-day-ahead estimates and real-time data (in increments no less than hourly).

- i. Were any of the Company-owned solar units in an outage status during the event period? If so, please describe.
- g. Provide a general summary of how the Company's QFs (non-utility-owned solar and non-solar) operated, as well as forecasted-day-ahead estimates and real-time data (in increments no less than hourly).
 - i. Was the Company made aware of any units being in an outage during the event period? If so, please describe.
 - ii. Based on post-event analysis, provide a general description of whether all non-utility-owned generation (solar and non-solar) operated as expected given the weather conditions during the event period in question.
 - iii. Did the Company call for any non-utility-QF generation to be curtailed during the event period in question? If so, why?
- h. Did the Company have any issues with coal pile freeze up? If so, please describe when the event occurred, what preventative actions were taken and why they did not prevent the issue, and how it impacted unit availability.
- i. Did the Company switch to back-up fuel oil at some generation units, and if so, why? If so:
 - i. Provide a timeline of the switch to back-up fuel oil and then the transition off of the back-up fuel oil during the event.
 - ii. Was the transition related to economic dispatch, fuel availability, or a combination? Please explain how the Company determines

- whether to switch between fuel source due to economic or uneconomic dispatch.
- iii. Were there any unit performance issues related to switching to back-up fuel oil or switching off back-up fuel oil? If so, please identify the units and associated problems/issues.
 - j. Provide a general summary of how the Company's coal and natural gas dual fuel operation plants operated, the fuel source used to operate, and when the decision was made to run off of the fuel source.
 - k. Please discuss any other fuel issues that occurred.
26. The following questions are specific to the rolling outages and load curtailment.
- a. Provide a general narrative that describes the Company's process for determining location and timing for rolling outages.
 - b. Who made the decisions to initiate the rolling outages?
 - c. When did the Company determine that rolling outages may have to occur?
 - d. When did the Company determine that rolling outages were the last resort and all other options were exhausted?
 - e. In regard to automation being used to activate rolling outages or demand reduction-like programs:
 - i. Please describe the automation that was in place.
 - ii. Please discuss whether the Company's automation for rolling outages worked as planned.

- iii. If the Company could not use the automated process and was relegated to instituting manual rolling outages, please provide a discussion and timeline of events.
- iv. Please describe how the Company has tested the actions of the automation in simulations and general testing.
- v. Did the Company ever test the automation in a way that was similar to the events that took place when the automation became unresponsive/failed (i.e., has the Company tested the automation by entering in a certain amount of curtailment and then entering in an additional curtailment before the first series of curtailments had completed and ensured that both the initial and subsequent curtailments performed as planned)?
- f. Please discuss how a system operator determines that a rolling outage is needed, the process for automation of circuits or, if necessary, the manual process in which the operators select the lines and outage durations.
- g. In the event of rolling outages or load shedding, please provide the communications plan that should be followed, including a list of the critical steps of public engagement and notification.
- h. Please describe the process for notifying customers prior to a rolling outage.
 - i. Did the Company follow this process? If not, explain why.
- i. Provide all mass communications to customers that occurred prior to and during the rolling outages.
- j. Provide a map of customers impacted by outages.

- k. Please explain why initial customer communication indicated 15-to-30-minute rolling outages, but many outages lasted much longer, in some cases several hours. How did the outage ranges evolve over time?
 - l. Why did the period of rolling outages extend beyond the originally contemplated time of 9:30 a.m. on December 26, 2022?
 - m. Provide a narrative with a timeline showing when the Company identified that either rolling outages or unit outages could impact wholesale customers.
 - i. Provide all communications with wholesale customers.
 - n. Provide all communications Duke had with the NCUC, SC PSC, NC Public Staff, and/or the SC ORS related to the rolling blackouts.
 - i. Prior to event.
 - ii. Real time during event.
 - iii. Subsequent to event.
27. Provide a timeline of the Company's Grid Status changes from December 23, 2022, through December 28, 2022.
28. Provide a timeline of the Company's NERC EEA status and changes from December 23, 2022, through December 28, 2022.
29. To the extent that it is known, please provide the NERC EEA statuses of adjacent utilities and utilities in the southeast and a timeline of changes to the statuses from December 23, 2022, through December 28, 2022.
30. Provide any notifications, request for relief, or emergency operations to or from the Department of Energy from December 23, 2022, through December 28, 2022.

31. Did the Company reduce or derate nuclear generation at any time from December 23, 2022, through December 28, 2022? If so, please describe the event and explain why the action had to take place and what other exhaustive actions had taken place prior to the reduction. (Note: EIA data indicates that a DEP nuclear plant had a unit derate on December 27 around noon and lasting a few hours while a slow up ramp occurred over a few hours.)
32. When did Robinson Nuclear Station start up and sync to the grid? In regard to maintaining ACE of near zero and stability of the Company's system from December 23, 2022, through December 30, 2022, please discuss how the Company was considering ramping, managing LROL, afternoon peaks, low load conditions as the temperatures started to increase, additional stressors of the system other than just the morning peak, unit start-up time requirements, minimum loading, etc., and provide any additional information, on a daily basis, which the Company believes is important for a complete understanding or to highlight.