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DEF's Responses to OPC's Fourth Set of Interrogatories, Nos. 31-39, 42, 44-47, 49, 51-57, 62-64.

(Including Attachments for Nos. 32-34)

Confidential DN 03337-2022

*Due to a duplication of No. 35, all responses after this one are to be taken as 1 greater than their stated response number (i.e. No. 36 in the response is marked No. 37 on this CEL entry)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Fuel and Purchased Power Cost Recovery Clause with Generating Performance Incentive Factor	DOCKET NO.: 20220001- EI DATED: MAY 31, 2022

DUKE ENERGY FLORIDA, LLC'S RESPONSE TO CITIZENS' THIRD SET OF INTERROGATORIES (NOS. 31-69)

Duke Energy Florida, LLC ("DEF") responds to the Citizens of the State of Florida, through the Office of Public Counsel's ("Citizens" or "OPC") Fourth Set of Interrogatories to DEF (Nos. 31-69) as follows:

INTERROGATORIES

In responding to questions 31-64, please refer to the Confidential Direct Testimony of Anthony Salvarezza filed on April 1, 2022.

31. On page 16 of Mr. Salvarezza's testimony, it is stated that the Unit 4A in-service failure in January 2021 resulted in a forced outage lasting into April 2021.
    a. Please provide a detailed schedule of the work performed during this outage.
    b. Please provide an explanation for the length of this outage.
    c. Provide all emails, correspondence, and other documentation associated with the schedule and duration of this outage.

Response:

a. The rotor was removed for inspection of the fault area, and repairs were attempted to address the damage from the fault on the stator core. Following the repair attempts, DEF was not satisfied with the stator core integrity and elected to purchase a replacement generator from Siemens that was in the Siemens Charlotte shop. This "footprint" generator was removed from long term storage in the laydown yard, prepared in the Charlotte shop for service with technical advisory updates, and then shipped to site for installation. Please see document bearing Bates Numbers 20220001-DEF-002424 through 20220001-DEF-002425 CONFIDENTIAL.
b. Please see DEF's response to Q31a.
c. Please see DEF's objection to this request filed on May 31, 2022.

32. On page 17 of Mr. Salvarezza's testimony, it is stated that the Unit 4C in-service failure in May 2021 resulted in a forced outage lasting into November 2021.

a. Please provide a detailed schedule of the work performed during this outage.

b. Please provide an explanation for the length of this outage.

c. Provide all emails, correspondence, and other documentation associated with the schedule and duration of this outage.

Response:

a. Due to stator core damage from the fault, a new "footprint" generator mid-section was required to be fabricated by Siemens. This stator core with new stator windings was manufactured in the Charlotte shop and shipped to site for installation. Please see document bearing Bates Numbers 20220001-DEF-002426 through 20220001-DEF-002430.
b. Please see DEF's response to Q32a.
c. Please see DEF's objection to this request filed on May 31, 2022.

33. On page 17 of Mr. Salvarezza's testimony, it is stated that the Unit 4D outage that was moved up to June 2021 lasted until October 2021.

a. Please provide a detailed schedule of the work performed during this outage.

b. Please provide an explanation for the length of this outage.

c. Provide all emails, correspondence, and other documentation associated with the schedule and duration of this outage.

Response:

a. Please see attached document bearing Bates Numbers 20220001-DEF-002431 through 20220001-DEF-002433.
b. Please see DEF's response to Q33a.
c. Please see DEF's objection to this request filed on May 31, 2022.

34. On bates page 20220001-DEF-001381, please confirm that the outage referred to began on the mobilization date and ended on the demobilization date cited in Table 1.4.

a. Please provide a detailed schedule of the work performed during this outage.

b. Please provide an explanation for the length of this outage.

c. Provide all emails, correspondence, and other documentation associated with the schedule and duration of this outage.

Response:

a. The planned outage began on 9/29/2019 and ended on 1/28/2020. The dates cited in Table 1.4 were the Siemens mobilization dates for work scheduled during this outage. This outage was a planned Generator Major outage, in which two stator bars failed during the planned hipot test, resulting in a scope escalation to a stator rewind, as described in Mr. Salvarezza's testimony on page 6. Please see document bearing Bates Numbers 20220001-DEF-002434 through 20220001-DEF-002447 and 20220001-DEF-002448 through 20220001-DEF-002449.
b. Please see DEF's response to Q34a.
c. Please see DEF's objection to this request filed on May 31, 2022.

35. On pages 15-16 of Mr. Salvarezza's testimony, it is stated that the stator rewinds for Units 4A, 4C, and 4D were moved up to outages in 2022, 2023, and 2024. Please provide a detailed explanation for delaying the stator rewind outages on these units until 2022 considering the findings of the Unit 4B Root Cause Analysis. Please provide all emails, correspondence, and other documentation on the rescheduling of these outages and the rescheduling decision process.

Response:

DEF disagrees with the question's premise that the stator rewind outages were "delayed" – as Mr. Salvarezza's testimony explains, the stator rewinds were *accelerated* by thousands of equivalent operating hours compared to the normal schedule for such an activity. Please see Mr. Salvarezza's testimony at page 16, lines 9-16. To the extent this question is asking why the rewinds were not *accelerated further*, there were multiple reasons DEF opted for the original schedule identified, not least among them being that DEF had no information that would have led to the conclusion that the units were incapable of operating to the scheduled outages nor did DEF even *know* that the other units were damaged – it was determined likely that the damage had been initiated, but there was no non-destructive testing available to definitively determine if that hypothesis was correct. Finally, when scheduling the rewind outages, DEF had to consider: system demand, other units' availability throughout the length of the potential outage, availability of the manufacturer to fabricate the necessary components (obviously DEF is not the only customer of the manufacturer and DEF has no ability to skip ahead in the manufacturer's queue), time to manufacture needed components once the manufacturer was able to begin), and availability of contractors to perform the work, the loss of a low-cost baseload unit and the need to produce and/or purchase higher cost replacement power during the outage, etc.

35. What testing was performed on Units 4A, 4C, and 4D after the Unit 4B stator bar issues described on page 6 of Witness Salvarezza's direct testimony was discovered?

a. Provide copies of all test reports on the generators.
b. Provide all emails, correspondence, and other documentation associated with testing and decisions to perform the testing.

Response:

a. As discussed in footnote 1 on page 7 – Units 4A, 4C, and 4D each successfully completed the same hipot testing that discovered the damage to Unit 4B. Please see page 13 for a discussion of additional borescope testing scheduled for Units 4A and 4C, as well as modifications to the EMSA collars. There is no other available testing that would have discovered the damage.
b. Please see DEF's objection to this request filed on May 31, 2022.

36. On pages 18-19 of Mr. Salvarezza's testimony, discussing the planning of outages at the remaining Bartow CTG units after the Unit 4A in-service failure and its resulting outage, it is stated that "any of the alternatives ultimately not selected carried its own set of risks and unknowns."

a. Please elaborate on the risks and unknowns of removing Unit 4C from service immediately after Unit 4A was returned to service in April 2021.
b. Please elaborate on the risks and unknowns of removing Unit 4D from service immediately after Unit 4A was returned to service in April 2021.

Response:

The "risks and unknowns" being referred to under either scenario were the same and include such unknows as whether or not the suspected damage was present at all, the risk that the other remaining unit suffered an in-service failure while the first was offline (i.e., that the "wrong" unit was taken offline), assuming the damage was found on whichever unit was taken off-line, the risk that the unit would have been offline for an indeterminate amount of time while DEF waited its turn in the manufacturer's queue and then fabricated the needed components, and the risk that a different unit altogether would either enter a forced outage or need to forego a planned outage to meet need while the unit was offline. Again, the point of the comment being referred to and the discussion that preceded it was simply to illustrate that there was no risk-free or perfect path forward available at the time.

37. When did DEF discover that the stator winding temperatures at the Bartow CTG units exceeded the comparative values noted on page 7, line 17 during the 2009-2013 timeframe?

a. Provide all information and documentation regarding Siemens' analysis of the winding's temperature.
b. Provide any revisions or recommendations from Siemens regarding changes in alarm setpoints.
c. Provide all emails, correspondence, and other documentation associated with Siemens' assessment of winding temperatures and alarm setpoints.

Response:

a. All information DEF is aware of on temperature analysis was provided in the Siemens RCA.
b. No recommendations were received from Siemens regarding changes to alarm setpoints, even to this date in 2022.
c. Please see DEF's objections to this request filed on May 31, 2022. Subject to and without waiving these objections, please see the RCA referenced in DEF's response to Q38a.

38. For Unit 4B, during the period of operation where the condition described on page 7, lines 14-16 that was determined by the RCA as the "main contributor" occurred, did plant operators note any effects (leakage, blocked vents, etc) from the main contributor?

Response:

No. The referenced components are internal to the generator and not visible by operators or other DEF staff without generator disassembly. The only computer indication was the stator RTDs which were slightly elevated, but still well within the OEM's recommended operating range, as discussed on page 10 of Mr. Salvarezza's.

[redacted]

41. Did DEF employ any temperature monitoring techniques at Bartow other than RTDs such as coating generator windings with chemical tagging compounds?

Response:

No. DEF does not use chemical tagging compounds for air-cooled generators.

[redacted]

[redacted]

43. Did DEF contract with any third parties to perform inspections of the stator windings on the Bartow CTG units during the 2019-2021 timeframe?

Response:

No.

44. Please refer to page 5, lines 19-21. Did DEF submit a claim to the OEM for the degraded part? If the answer is yes, please state the current status of that claim. If the answer is no, explain why not.

Response:

Subject to and without waiving DEF's objection to this request filed May 31, 2022, no claim was filed as the component was past warranty period.

45. Please refer to page 5, lines 19-21. State in which units upgrades were installed as described in the referenced lines and how many of the degraded parts in each unit were upgraded.

Response:

Upgrades were installed on all four Bartow CTG during planned outages in Fall 2012 and Spring 2013. 10 components per generator were upgraded (40 total). Reference Siemens Product Bulletin PB3-13-0008-GN-EN-01 4 for graphical representation of sealing arrangement.

46. Please refer to page 5, lines 19-21. Did these upgrades occur during a planned outage? If the answer is no, explain the type of outage, date, duration and MW affected.

Response:

Yes - planned outage for all four units.

[redacted]

[redacted]

48. Explain whether DEF or the OEM is responsible for maintenance of the RTD alarm.

Response:

DEF is responsible for RTD maintenance.

[redacted]

50. Please refer to page 13, line 8-9. Provide the dates on which DEF learned of the cause of Unit 4B's damage and the date on which DEF learned that the remaining units may have experienced similar damage.

Response:

DEF learned on the cause of the damage and the potential damage at the other units when it received the Siemens RCA.

51. Please refer to page 13. Provide the date that each of the cited steps was planned for action and the date of completion (reconfiguration of EMSA collars on Units 4A and 4C; borescope inspections; procurement of spare set of stator bars; scheduled generator rewinds).

Response:

Completion dates for reconfiguration of EMSA collars is located in footnotes of testimony on Page 13. Borescope inspections were not completed prior to failure on Units 4A or 4C. Spare stator bar purchase was not yet finalized at the time of failure of 4A. Please see pages 15-16 of Mr. Salvarezza's testimony for response to scheduling generator rewinds.

52. Explain why DEF chose to do borescope camera inspections to detect buckling insulation when it is not a proven method of inspection for the issue the company sought to identify.

Response:

The borescope inspection was evaluated based on an attempt to better quantify risk to the generator in an attempt to determine if there were any signs of buckled insulation. That is, although not a "proven method" for detecting buckling insulation, DEF determined that it was nonetheless an avenue worth exploring.

53. State each alternative method DEF considered to look for buckled insulation and why each method was not chosen.

Response:

As stated in response to Q53, DEF scheduled borescope inspections on the remaining units. Other available options that were not selected included a "major inspection" which would have entailed physically removing the generator rotor and performing a visual inspection; DEF determined that, due to the time and expense of such an outage, it would have been more prudent to instead schedule the units for a rewind (which DEF also did, as described in Mr. Salvarezza's testimony and in response to interrogatory 35). Please note, at the time the damage was discovered on Unit 4B, each of the remaining units had recently undergone and passed the hipot testing that discovered the damage on unit 4B. While hipot testing would not detect buckled insulation, it would detect weakness in the insulation but is also a destructive test (above the level of the insulation resistance weakness) that would likely have required a rewind if the units failed the test. Due to the nature of the hipot test and the fact that it consumes a small portion of the insulation life each time it is performed, DEF determined it was not justified to reperform the test on these units again since they had each passed this same test within the previous 2 years.
Another option considered was radiography of the stator bars to determine if damage existed in the insulation. After discussing this option with the OEM, it was determined that the most probable location of the damage, as identified in the failed stator bars during the hipot, was not accessible to be able to perform the radiograpy test because of physical obstructions in close proximity to the suspect location.

54. Please refer to page 9, lines 18-20 and page 15 lines 13-15. Reconcile the cited statement on page 9 with the contention on page 15 that breaches resulting in failure occur "in milliseconds and not slowly over time."

Response:

The damage initiated in the insulation slowly propagated over time, but slight damage would not be expected to immediately fail a stator bar, since insulation around the copper current-carrying components is composed of multiple layers. However, as the damage progressed and further weakened the mechanical strength at that location, it would continue to grow through multiple layers of insulation until the point at which the voltage level internal to the stator bar exceeded the insulation capability, at which point the failure would occur in milliseconds. Trending damage propagation of this type is not possible in the area of vulnerability on this specific design.

55. Provide the date and actual equivalent hours for each unit when the rewind was conducted.

Response:

4A: Jan 12, 2021, at 89,124 Equivalent Operating Hours (EOH)
4B: Sept 28, 2019, at 78,076 EOH

4C: May 15, 2021, at 91,036 EOH
4D: June 19, 2021, at 94,802 EOH

56. Provide the OEM's fleet experience data for the Siemens model SGen6-1000A combustion turbine generator including the number of units of this model that are in service and the number of units that have experienced degradation of the confidential part cited on page 5, line 20.

Response:

This data is provided in the Siemens RCA Section 2.4. Siemens has never communicated the number of units in their fleet that experienced degradation of the confidential part to DEF.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted].

61. State each alternative method DEF considered to look for the issue described on page 8, lines 8-9 and why each method was not chosen.

Response:

Each unit was hipot tested during 2018-2019 to validate insulation integrity of the stator bars as part of planned generator outage inspections. Please also see Mr. Salvarezza's testimony on page 14. Tan delta and power factor testing were performed on Unit 4D after discovery of the issue on 4B in Fall 2019. Test results are located in the Outage Report.

62. Please refer to your responses to OPC's 2nd PODs, bates page 202200001-DEF-000484. Provide the number of start-stop cycles the Bartow unit referred to in this technical advisory product bulletin had undergone when the bulletin was issued on November 19, 2019.

Response:

This bulletin refers to the generator rotor and is unrelated to the generator stator.

63. If the answer to interrogatory 63 is more than 1000, provide the date on which DEF conducted the recommended inspection.

Response:

All units are under 1000 start/stop cycles at the time of the most recent outage.

[redacted]

AFFIDAVIT

STATE OF FLORIDA

COUNTY OFPINELLAS

I hereby certify that on this 14th day of June, 2022, before me, an officer duly authorized in the State and County aforesaid to take acknowledgments, personally appeared ANTHONY SALVAREZZA, who is personally known to me, and he acknowledged before me that he provided the answers to interrogatory numbers 31 through 69, from the CITIZENS' FOURTH SET OF INTERROGATORIES TO DUKE ENERGY FLORIDA, LLC (NOS. 31-69) in Docket No. 20220001, and that the responses are true and correct based on his/her personal knowledge.

THE FOREGOING INSTRUMENT was sworn to and subscribed before me by means of ☐ physical presence or **X** online (video) notarization by ANTHONY SALVAREZZA, who is personally known to me.

In Witness Whereof, I have hereunto set my hand and seal in the State and County aforesaid as of this 14th day of June, 2022.

Anthony Salvarezza

MONIQUE WEST
MY COMMISSION # GG 343812
EXPIRES: June 28, 2023
Bonded Thru Notary Public Underwriters

Notary Public
State of Florida, at Large

My Commission Expires: