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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

December 6, 2011

EA-11-226

Mr. T. Preston Gillespie, Jr.
Site Vice President
Duke Energy Carolinas, LLC
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF ONE YELLOW FINDING AND ONE GREEN FINDING AND NOTICE OF VIOLATION (NRC INSPECTION REPORT 05000269/2011019, 05000270/2011019, AND 05000287/2011019 - OCONEE NUCLEAR STATION)

Dear Mr. Gillespie:

This letter provides you with the final significance determination of two preliminarily Greater than Green findings discussed in NRC Inspection Report (IR) 05000269/2011017, 05000270/ 2011017, and 05000287/2011017 dated September 7, 2011, and NRC IR 05000269/2011018, 05000270/2011018, and 05000287/2011018 dated October 4, 2011. These two findings involved installation of Standby Shutdown Facility (SSF) pressurizer heater breakers that were not qualified for the expected environmental conditions as required by 10 CFR 50 Appendix B, Criterion III, Design Control. The finding discussed in NRC IR 05000269, 270, 287/2011017 related to the licensee identifying that the installed breakers would not function for the required mission time during station blackout and seismically-induced internal flooding events. The finding discussed in NRC IR 05000269, 270, 287/2011018 related to the licensee declaring the SSF operable before completing all required testing of replacement breakers.

At your request, a Regulatory Conference was held on November 16, 2011, to discuss your views of these findings. A copy of the slide presentation made by Duke Energy Carolinas, LLC (DEC) was included in the meeting summary issued on November 29, 2011, (ADAMS Accession number ML11333A342). During the conference, DEC presented its assessment of the significance of the findings and the corrective actions taken to address the underlying issues. Specifically, DEC presented additional information, summarized in Enclosure 2, concerning the risk characterization of these findings. The bases for the NRC's significance determination for these findings are discussed in Enclosure 3. The key differences between the licensee's risk characterization and the NRC's significance determination involved consideration of electrical bus duct fault frequency and the probability of successful solid water operations.

~~Enclosures transmitted herewith contain SUNSI. When separated from Enclosure 3, this document is decontrolled.~~

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Based on information presented at the regulatory conference and in subsequent communications, the NRC created an Event Tree (Enclosure 3, Table 1) to display the SSF failures that could have been caused by the loss of the SSF pressurizer heater breakers. The critical parameter driving the risk for these findings was the degree of confidence in the accuracy of the computer model predictions of actual reactor coolant system (RCS) response, including the ability to maintain adequate RCS subcooling margin. The NRC observed that the analytic tools used by DEC resulted in highly variable predictions of core heat transfer. This variability had a significant impact on the calculated margin between hot leg, or core exit temperature, and the system saturation temperature (i.e. subcooling margin), particularly at the low-pressure extreme of the RCS pressure control band. A loss of subcooling margin would impact RCS natural circulation cooling. Additional data concerning a single natural circulation event at Oconee corroborated the codes' predictions, but did not fully address the variability in the predicted results. Based on NRC's assessment, the data provided a reasonable but limited degree of confidence concerning DEC's estimate of available subcooling margin when controlling RCS pressure between 1600 psi and 2200 psi. The data and code-to-code comparisons demonstrate that an adjustment for this limited degree of confidence in the prediction of system conditions is appropriate to include in the risk evaluation. Based on NRC's assessment, a 75% subcooling margin confidence factor was assigned to this portion of the risk evaluation.

After considering the information developed during the inspection and the information provided by DEC during and after the conference, the NRC has concluded that finding 05000269, 270, 287/2011017-01, Pressurizer Heater Breaker Installation That Would Not Have Functioned During Certain SSF Credited Events, is appropriately characterized as Yellow, a finding of substantial safety significance. Although the risk evaluation calculated the finding as Red for Units 1 and 2, and Yellow for Unit 3, the NRC determined that the appropriate characterization for all three Units was Yellow based, in part, on the high influence and subjectivity of the subcooling margin confidence factor described above. The NRC has also concluded that finding 05000269, 270, 287/2011018-01, Installation of Non-Qualified SSF Pressurizer Heater Breakers Impacting Operability During Certain SSF Credited Events, is appropriately characterized as Green, a finding of very low safety significance.

Additionally, DEC characterized finding 05000269, 270, 287/2011017-01 as an old design issue in accordance with NRC Inspection Manual Chapter (IMC) 0305, Operating Reactor Assessment Program, and subsequent to the Regulatory Conference, submitted additional information supporting its request. In order for the NRC to determine if this finding meets the criteria for treatment as an "old design issue", additional information is required. Until this determination is made, this finding will not aggregate in the NRC Action Matrix. The NRC plans to perform an additional inspection by the end of January 2012 to evaluate DEC's completed root cause analysis for both findings. The results of this evaluation will be used to make a determination if discretion for an old design issue is warranted. It should be noted that IMC 0305 specifies the need for a 95002 inspection even if the yellow finding meets the criteria for treatment as an old design issue.

You have 30 calendar days from the date of this letter to appeal the staff's significance determination for these findings or the Notice of Violation. An appeal of these findings will be considered to have merit only if it meets the criteria given in NRC IMC 0609, Attachment 2.

The NRC has also determined that failure to maintain SSF pressurizer heater breaker qualification is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control, as cited in the attached Notice of Violation (Notice). The circumstances surrounding the violation were described in detail in the referenced inspection reports. In accordance with the NRC Enforcement Policy, the Notice is considered escalated enforcement action because it is associated with a Yellow finding.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in the information presented by DEC at the conference. Therefore, you are not required to respond to this letter unless the description herein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

Because plant performance for this issue has been determined to be beyond the licensee response band of the NRC Action Matrix, we will use the Action Matrix to determine the most appropriate NRC response for this condition once we complete our assessment of whether it meets the criteria for an old design issue. We will notify you of that determination by separate correspondence.

For administrative purposes, this letter is issued as NRC IR 05000269/2011019, 05000270/2011019, and 05000287/2011019. Accordingly, consistent with the regulatory positions described in this letter AV 05000269, 270, 287/2011017-01 is updated as VIO 05000269, 270, 287/2011017-01 with a safety significance of Yellow and no cross-cutting aspect and AV 05000269, 270, 287/2011018-01 is updated as NCV 05000269, 270, 287/2011018-01 with a safety significance of Green and a cross-cutting aspect in the area of Human Performance.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to submit one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. However, because of the security-related information contained in Enclosure 3, and in accordance with 10 CFR 2.390, a copy of Enclosure 3 will not be available for public inspection. Should you chose to respond to the extent possible your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Should you have any questions concerning this letter, please contact Mr. Jonathan Bartley at 404-997-4607.

Sincerely,

/RA/

Victor M. McCree
Regional Administrator

Docket Nos.: 50-269, 50-270, 50-287
License Nos.: DPR-38, DPR-47, DPR-55

Enclosures:
1. Notice of Violation
2. NRC Resolution of Licensee Regulatory Conference Points
3. NRC Bases for Final Significance Determination

cc w/encls: (see page 5)

Should you have any questions concerning this letter, please contact Mr. Jonathan Bartley at 404-997-4607.

Sincerely,

/RA/

Victor M. McCree
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Docket Nos.: 50-269, 50-270, 50-287
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cc w/encls: (see page 5)

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ADAMS: ☐ Yes ACCESSION NUMBER: ML11340A139 ☐ SUNSI REVIEW COMPLETE

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NAME	JBartley	RCroteau	RBernhard	CEvans	LWert	VMcCree	
DATE	12/1/2011	12/2/2011	12/6/2011	12/2/2011	12/6/2011`	12/6/2011	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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Letter to T. Preston Gillespie, Jr. from Victor M. McCree dated December 6, 2011

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF ONE YELLOW FINDING AND ONE GREEN FINDING AND NOTICE OF VIOLATION (NRC INSPECTION REPORT 05000269/2011019, 05000270/2011019, AND 05000287/2011019 - OCONEE NUCLEAR STATION)

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NOTICE OF VIOLATION

Duke Energy Carolinas, LLC
Oconee Nuclear Station
Units 1, 2, and 3

Docket Nos.: 50-269, 50-270, 50-287
License Nos.: DPR-38, DPR-47, DPR-55
EA-11-226

During an inspection and in-office review completed on September 28, 2011, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is set forth below:

10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that measures shall be established to assure that deviations from appropriate quality and design standards are controlled and that the review for suitability of application of equipment essential to safety-related functions of structures, systems, and components is maintained. Technical Specification 3.10.1.A requires that, with the Standby Shutdown Facility (SSF) Auxiliary Service Water inoperable, the system shall be restored to an operable status within seven days or the unit placed in Mode 3 within 12 hours and Mode 4 within 84 hours.

Contrary to the above, from 1983 until June 1, 2011, a review for suitability of application of equipment essential to safety-related functions of structures, systems, and components was not performed. Specifically, the licensee failed to maintain the SSF pressurizer heater breakers and associated electrical components as safety-related QA-1 and seismically-qualified components in accordance with the licensing and design bases. The licensee implemented a modification to the SSF that used installed breakers which had not been tested to verify that they would function at elevated containment temperatures and maintain SSF functionality in accordance with the licensing and design basis. As a result, the Standby Shutdown Facility was inoperable from 1983 until June 1, 2011, a period in excess of the Technical Specification 3.10.1.A allowed outage time.

This violation is associated with a Yellow finding.

The NRC has concluded that information regarding: (1) the reason for the violation; (2) the actions planned or already taken to correct the violation and prevent recurrence; and, (3) the date when full compliance was achieved, is already adequately addressed on the docket in the information presented by DEC at the Regulatory Conference on November 16, 2011 (ML11333A342). However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation, EA-11-226," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at Oconee, within 30 days of the date of the letter transmitting this Notice.

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated the 6th day of December 2011

EA-11-226

NRC Resolution of Licensee Regulatory Conference Points

At the regulatory conference, DEC highlighted its assumptions used in determining the risk associated with the two findings, and the differences between its risk calculations and those performed by the NRC as part of the Significance Determination Process (SDP). The paragraphs below provide a summary of the technical differences and the NRC's bases for incorporating DEC's assumptions into the NRC's final SDP.

1. DEC Input - DEC noted that NRC used a 0.1 Human Error Probability (HEP) in its preliminary SDP analysis. DEC calculated a HEP of 0.018 using industry-accepted analysis techniques. This was based on detailed procedures for plant cooldown using natural circulation, that solid water operations are part of continuous operator training, that the SSF controls are centrally located in the SSF control room, and that revisions to the procedure reduced the number of valve strokes and required operator actions.

   NRC Consideration - A review was performed of the HEP calculations, and some non-conservatisms were identified in the DEC analysis. Based on sensitivity calculations, it was determined that the final SDP results were not affected by the difference in the HEP values.

2. DEC Input - DEC noted that NRC used a bus duct fire ignition frequency of $3.3X10^{-3}$ in its preliminary SDP analysis. DEC noted that NRC used a frequency of $2.4X10^{-3}$ in the SDP for the SSF Letdown Line blockage findings.

   NRC Consideration - The NRC used a lower updated value of $2.07X10^{-3}$ that considered the one additional event and the additional decade of experience since the standard number in the initial analysis was developed.

3. DEC Input - DEC noted that NRC used a pressurizer safety valve (PSV) failure probability of 1.0 in its preliminary SDP analysis. DEC noted that NRC used a failure value of 0.1 for the PSV failure in the SDP for a prior finding at Oconee relating to the SSF Letdown Line blockage.

   NRC Consideration – After considering the similarities on the demands placed on the PSV for the prior finding, the NRC has updated the analysis to use PSV failure rate of 0.1 in the operator response path calculations.

4. DEC Input - DEC noted that NRC assumed that a station blackout would occur if certain cable trays were affected by a bus duct fire. DEC performed a detailed cable failure analysis that reduced the overall effective length of the cables that would result in a station blackout.

NRC Consideration - The results of the preliminary analysis from the licensee were incorporated into the calculations (Enclosure 3, Table 5). The output of the calculation was effective linear feet of cable tray that, if affected by a bus duct failure, could result in a station blackout scenerio.

5. DEC Input - DEC noted that NRC assumed the replacement breakers would have failed prior to the 72-hour mission time and used a failure probability for the replacement breakers of 1.0 in its preliminary SDP analysis. DEC conducted additional environmental testing which demonstrated that there is a probability that the replacement breakers would not have failed prior to the 72-hour mission time.

   NRC Consideration - The replacement breaker failure rate was modified based on the testing of the breakers. Based on the results, the failure rate was modified to reflect one half failure in 5 tests for a failure rate of $1 X10^{-1}$.