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

June 26, 2014

EA-14-091

Mr. Scott Batson
Site Vice President
Duke Energy Carolinas, LLC
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION – NRC INSPECTION REPORT NUMBER
05000269/2014011, PRELIMINARY GREATER THAN GREEN FINDING AND
RELATED APPARENT VIOLATION

Dear Mr. Batson:

This letter discusses a finding that has preliminarily been determined to be Greater than Green, (i.e., greater than very low significance), and has resulted in the need for further evaluation to determine the final significance and therefore the need for additional NRC action. As described in Section 4OA3 of the enclosed inspection report, a self-revealing finding and related apparent violation of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, was identified. Your measures failed to identify and correct a significant condition adverse to quality involving a crack in a weld located in the Unit 1 High Pressure Injection (HPI) system. In 2004, a procedure was developed for augmented in-service inspection program ultrasonic examinations which effectively removed reasonable assurance that HPI nozzle component weld cracking would be identified and corrected. This finding was assessed based on the best available information using the applicable Significance Determination Process (SDP). The final resolution of this finding will be conveyed in separate correspondence.

The basis for our significance determination is provided as Enclosure 2. The analyst performed a condition analysis representing the increase in risk due to the deficient non-destructive examination procedure. The initiating event frequencies for small-break loss of coolant accident were increased to a Conditional Rupture Probability (CRP) value that represented the likelihood of failure given that the leak had occurred. The risk due to external events i.e., seismic was also calculated and summed with the internal events risk. Multiple cases and sensitivity cases were evaluated with the risk ranging from 1E-5 to 7E-5. So that we can make a final significance

~~Enclosure transmitted herewith contains SUNSI. When separated from Enclosure 2 this transmittal document is decontrolled.~~

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determination, we are requesting that you provide the following additional information. If possible, please provide this information at least one week prior to the Regulatory Conference (should you choose to request one) so that we can reassess our significance determination based on the results.

- Unit 1 specific CRP value calculated based on the actual operating experience at Oconee.
- Probabilistic fracture mechanics analysis, including rupture probabilities, for the following cases.
 - Seismic events, i.e., design basis earthquake.
 - Events where reactor coolant system pressure could increase (i.e. a load reject event).
 - Vibration induced failures for 100 percent power operation, 3-loop operation, and full-flow HPI testing.
 - High pressure injection “demand cases,” specifically fire scenarios and HPI forced cooling, where the system is called upon to function to establish safe shutdown and would have functioned normally, but because of the flaw/crack would result in a leak/loss of coolant accident.

This finding is also an apparent violation (AV) of NRC requirements and is being considered for escalated enforcement action in accordance with the Enforcement Policy which can be found on the NRC’s Web site.

In accordance with NRC Inspection Manual Chapter 0609, we intend to complete our evaluation using the best available information and issue our final determination of safety significance within 90 days of the date of NRC Inspection Report 05000269, 270, 287/2014002 where this issue was first identified, which would be August 10, 2014. The significance determination process encourages an open dialogue between the NRC staff and the licensee; however, the dialogue should not impact the timeliness of the staff’s final determination.

Before we make a final decision on this matter, we are providing you with an opportunity to:

- 1) attend a Regulatory Conference where you can present to the NRC your perspective on the facts and assumptions the NRC used to arrive at the finding and assess its significance; or
- 2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. The focus of the Regulatory Conference is to discuss the significance of the finding and not necessarily the root cause(s) or corrective action(s) associated with the finding. If a Regulatory Conference is held, it will be open for public observation. If you decide to submit only a written response, such submittal should be sent to the NRC within 30 days of your receipt of this letter. If you decline to request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination, in that by not doing either, you fail to meet the appeal requirements stated in the Prerequisite and Limitation sections of Attachment 2 of NRC Inspection Manual Chapter 0609.

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S. Batson

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Please contact Gerald McCoy at 404-997-4551 and in writing within 10 days from the issue date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. The final resolution of this matter will be conveyed in separate correspondence. Because the NRC has not made a final determination in this matter, no Notice of Violation is being issued for these inspection findings at this time. In addition, please be advised that the number and characterization of the apparent violation described in this letter may change as a result of further NRC review.

This finding was previously documented in Section 4OA3 of NRC Inspection Report 05000269, 270, 287/2014002 as an apparent violation of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings. However, due to the re-characterization of the apparent violation as a violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, the enclosed inspection report (Enclosure 1) supersedes Section 4OA3 of NRC Inspection Report 05000269, 270, 287/2014002 and AV 05000269/2014002-01 is administratively closed by this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter without its enclosure will be made available electronically for public inspection in the NRC Public Document Room and in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/Mark Lesser RA for/

Joel T. Munday, Director
Division of Reactor Projects

Docket Nos.: 50-269
License Nos.: DPR-38

Enclosures:

1. Inspection Report 05000269/2014011
2. Significance Determination, SRA Analysis
Number OCO-1306 w/Attachments
(Official Use Only – Security Related Information)

cc w/encl: See page 4
cc w/o encl distribution via ListServ

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Sincerely,
/Mark Lesser RA for/

Joel T. Munday, Director
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ADAMS: Yes ACCESSION NUMBER: SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DRP	RII:DRP	RII:DRS	RII:DRP	RII:DRP	RII:DRP	RII:EICS	OE	NRR
SIGNATURE	CWR /RA/	Via email	Via email	CWR /RA for/	MSL /RA/	MSL /RA for/	SES /RA for/		
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DATE	06/25/2014	06/25/2014	06/24/2014	06/25/2014	06/26/2014	06/26/2014	06/26/2014		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO		YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: [HTTP://FUSION.NRC.GOV/REGIONS/RII/DRP/BRANCH1/SDP](http://fusion.nrc.gov/regions/rii/dr/branch1/sdp) AND
SERP INFO/OCO HHSI/OCONEE RCS LEAK CHOICE LETTER PUBLIC.DOCX

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cc w/Encls:

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Letter to Scott L. Batson from Joel T. Munday dated June 26, 2014

SUBJECT: OCONEE NUCLEAR STATION – NRC INSPECTION REPORT NUMBER
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**U. S. NUCLEAR REGULATORY COMMISSION
REGION II**

Docket Nos: 50-269

License Nos: DPR-38

Report No: 05000269/2014011

Licensee: Duke Energy Carolinas, LLC

Facility: Oconee Nuclear Station, Unit 1

Location: Seneca, SC 29672

Dates: April 1, 2014 – June 19, 2014

Inspectors: E. Crowe, Senior Resident Inspector
R. Williams, Reactor Inspector (Section 4OA3)

Approved by: Joel T. Munday, Director
Division of Reactor Projects

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Enclosure 1

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SUMMARY OF FINDINGS

IR 05000269/2014-011; 04/01/2014 – 06/19/2014; Oconee Nuclear Station Unit 1; Follow-up of Events and Notices of Enforcement Discretion (NOED)

The report covered a 12-week period of inspection by the Oconee resident inspectors and region-based staff. One Greater than Green finding and associated apparent violation was identified. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP) dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas" dated December 19, 2013. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Initiating Events

TBD. A self-revealing potentially Greater than Green AV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified when the licensee failed to identify a crack in a weld located in the Unit 1 High Pressure Injection (HPI) system. In 2004, a procedure was developed for augmented in-service inspection program ultrasonic examinations which effectively removed reasonable assurance that HPI nozzle component cracking would be identified and corrected. NDE-995, "Ultrasonic Examination of Small Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage," did not contain the necessary steps to achieve acceptable coverage for UT examinations when limitations were encountered.

The inspectors determined that the failure to ensure that station procedure NDE-995 was adequate to identify and correct cracking in weld 1-RC-201-105 was a performance deficiency. The inspectors determined that the performance deficiency was more than minor because it affected the Design Control attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective in that an unidentified crack resulted in reactor coolant system pressure boundary leakage and a forced shutdown of Unit 1. The finding was determined to require a detailed risk analysis because the condition could have resulted in a leak which exceeded the reactor coolant system leak rate for a small-break loss of coolant accident. There was no immediate safety concern because the crack was repaired. The inspectors determined this finding has a cross-cutting aspect of H.7 in the Documentation component of the Human Performance area because the licensee did not create and maintain complete, accurate, and up-to-date documentation in procedure NDE-995 to ensure acceptable coverage for UT examinations.

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REPORT DETAILS

4OA3 Follow-up of Events and Notices of Enforcement Discretion (NOED)

.2 (Closed) LER 05000269/2013-04, High Cycle Fatigue Resulted in Reactor Coolant Leak and Unit Shutdown

On November 11, 2013, the licensee determined that a leak in the 1B2 high pressure injection line was pressure boundary leakage. Unit 1 was subsequently shutdown as required by TS 3.4.13. The inspectors monitored the orderly shutdown of Unit 1 and the licensee's repair activities. The inspectors also evaluated the licensee's extent of condition review and activities associated with additional non-destructive evaluations performed on other Unit 1 high pressure injection nozzles. Unit 2 was shutdown for a refueling outage at the time of this event; therefore, the high pressure injection nozzles were accessible for non-destructive evaluations which were also reviewed by the inspectors. The inspectors verified the accuracy of the LER, the appropriateness of completed and planned corrective actions, and reviewed the licensee's root cause evaluation. The licensee entered this issue into their corrective action program as PIP O-13-13168.

b. Findings

Introduction: A self-revealing potentially Greater than Green AV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified when the licensee failed to establish measures to identify and correct a crack in a weld located in the Unit 1 High Pressure Injection (HPI) system. In 2004, a procedure was developed for augmented in-service inspection program ultrasonic examinations which effectively removed reasonable assurance that HPI nozzle component cracking would be identified and corrected. Procedure NDE-995 "Ultrasonic Examination of Small Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage," did not contain the necessary steps to achieve acceptable coverage for UT examinations when limitations were encountered.

Description: In 2004, the licensee issued procedure NDE-995. This procedure limited the number and type of UT probes permitted for use (i.e. eliminated the potential to use a 70° angle probe) and omitted earlier guidance on how to address limitations encountered during the examination which result in the examination coverage not being achieved. As a result, numerous examinations performed on HPI safe end-to-piping welds using procedure NDE-995 did not completely cover the affected area and the less than adequate coverage was not assessed.

On November 11, 2013, the licensee investigated increased unidentified leakage and discovered a circumferential crack in weld 1-RC-201-105 located on the Unit 1 HPI nozzle to cold leg interface of the 1B2 reactor coolant pump suction pipe. The crack ran along the pipe side edge of the weld root from approximately 0° to 65° (~1.2 inches in length). The licensee reviewed the results of the previous UT examination performed in 2012 using procedure NDE-995 and found no reportable indications.

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However, in 2011 the licensee performed a radiographic examination specifically to check the condition and position of the 1B2 thermal sleeve. The focus of the review was limited to that area; however, the safe end area containing weld 1-RC-201-105 was incidentally visible on the film. Following the current event, the licensee re-reviewed the 2011 radiographic film and a crack-like indication was identified in the side wall image of the weld at approximately the same location as the current crack location. From the re-review of the film, this crack-like indication appeared to be approximately 50 percent through-wall.

Following the identification of the 1B2 through-wall crack, the licensee performed an extent of condition using phased-array UT on the eight HPI safe end-to-pipe welds in Unit 1 and Unit 2 (Unit 3 was still operating at the time so the inspections were not performed). The inspections showed additional recordable indications on nozzles 1B1, 2A2 and 2B2. All of these indications were analyzed and found to be acceptable for continued service.

Analysis: The inspectors determined that the licensee's failure to establish sufficient measures to identify and correct a significant condition adverse to quality involving a crack in weld 1-RC-201-105 was a performance deficiency. Procedure NDE-995 did not contain necessary steps to achieve acceptable examination coverage when limitations were encountered. The inspectors determined that the finding was more than minor because it affected the Design Control attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective in that an undetected crack was allowed to propagate and resulted in reactor coolant system pressure boundary leakage and a forced shutdown of Unit 1. Using the Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, dated June 19, 2012, the finding was determined to require a detailed risk analysis because the condition could have resulted in a leak which exceeded the RCS leak rate for a small-break LOCA. There was no immediate safety concern because the crack was repaired. The inspectors determined this finding has a cross-cutting aspect of H.7 in the Documentation component of the Human Performance area because the licensee did not create and maintain complete, accurate, and up-to-date documentation in procedure NDE-995 to ensure acceptable coverage for UT examinations.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. In the case of significant conditions adverse to quality (SCAQ), the measures shall assure the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, prior to November 11, 2013, the licensee failed to establish measures to identify and correct a significant condition adverse to quality involving a crack in weld 1-RC-201-105 located on the Unit 1 High Pressure Injection (HPI) piping-to-cold leg nozzle safe end interface of the 1B2 reactor coolant pump suction pipe, which resulted in non-isolable pressure boundary leakage while the reactor was in Mode 1. In

2004, the licensee developed a new procedure for augmented in-service inspection program ultrasonic examinations, which changed earlier guidance and effectively removed reasonable assurance that HPI nozzle component cracking would be identified and corrected. In 2012, the licensee performed procedure NDE-995, "Ultrasonic Examination of Small Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage," on weld 1-RC-201-105, and did not identify any reportable indications. After the Unit 1 transition to Mode 3 on November 11, 2013, to investigate non-isolable pressure boundary leakage, the licensee identified a through-wall circumferential crack in weld 1-RC-201-105. This crack was verified to be existing prior to 2012 based on review of a 2011 radiographic examination to check the position of the 1B2 thermal sleeve which revealed a crack-like indication in weld 1-RC-201-105 that was approximately ≥ 50 percent through wall.

Because the finding is potentially Greater than Green, this violation is being treated as an AV consistent with the NRC Enforcement Policy and is identified as AV 05000269/2014011-01: Failure to Identify and Correct Weld Cracking in HPI Nozzle. However, no enforcement is being issued at this time because the NRC has not made a final safety significance determination.

40A6 Management Meetings (Including Exit Meeting)

On June 23, 2014, the inspection results were presented to Mr. Robert Guy and other members of licensee management. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.