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10 CFR 50.4

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Duke Energy Carolina, LLC (Duke Energy)
Oconee Nuclear Station, Unit 3
Docket Number 50-287
Renewed License Number DPR-55

Subject: Notification of Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" for Oconee Nuclear Station, Unit 3

References:

1. Nuclear Regulatory Commission (NRC) Order Number EA-12-049, *Order Modifying Licensees With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012 (Accession No. ML12054A735).
2. Oconee Nuclear Station's *Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify Licenses With Regard To Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order EA-12-049)*, dated February 28, 2013 (Accession No. ML13063A065).
3. Oconee Nuclear Station, Units 1, 2, and 3 - Report for the Onsite Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Instrumentation Related to Orders EA-12-049 And EA-12-051 (TAC NOS. MF0782, 0783, 0784, 0785, 0786, AND 0787), dated October 6, 2015 (Accession No. ML15259A387).
4. Oconee Nuclear Station, Unit 2 - *Notification of Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" for Oconee Nuclear Station, Unit 2* (Accession No. ML16028A194).

Ladies and Gentlemen

This letter provides notification that Unit 3 at Oconee Nuclear Station (ONS) is in full compliance with the NRC's Order regarding mitigation strategies for beyond design-basis events (the second of three units).

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" (Reference 1). The Order required 10 CFR 50 license holders to submit an Overall Integrated Plan (OIP) describing how compliance with the Order would be achieved. The Oconee Nuclear Station OIP for Order EA-12-049 was submitted by letter dated February 28, 2013 (Reference 2).

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Section IV.A.2 of Order EA-12-049, requires full implementation of the Order to be completed no later than two (2) refueling cycles after submittal of the overall integrated plan, or December 31, 2016, whichever comes first. Thus for ONS Unit 3, full implementation was required prior to restart from the End-of-Cycle 28 (EOC28) refueling outage.

Unit 3 established full compliance with Order EA-12-049 by entering Mode 2 (Startup) following EOC28 on May 15, 2016. As demonstrated by this submittal, and other docketed correspondence concerning this Order, ONS Unit 3 is in full compliance with Order EA-12-049.

Section IV.C.3 of Order EA-12-049 also requires Licensees to notify the NRC after full compliance is achieved. Attachment 1 provides a brief summary of the key elements associated with ONS Unit 3 compliance of Order EA-12-049. The NRC Audit Report (Reference 3) open and pending items are provided in Attachment 2 along with a summary response that addresses each item. As such, Duke Energy considers these items complete, pending NRC closure. In support of the ongoing NRC Audit process, Duke Energy will continue to work with the NRC staff for issuance of a combined Safety Evaluation (SE) for the Mitigation Strategies Order.

This letter contains no new or revised Regulatory Commitments.

Should you have any questions regarding this submittal, please contact David Haile with Oconee Regulatory Affairs, at (864) 873-4742.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 11, 2016.

Sincerely,

Scott L. Batson
Vice President
Oconee Nuclear Station

Attachments:

1. Oconee Nuclear Station, Unit 3, Summary of Compliance Elements for Order EA-12-049
2. Oconee Nuclear Station, Unit 3, NRC Audit Report Open and Pending Items

cc:
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Mr. Eddy Crowe
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ATTACHMENT 1

OCONEE NUCLEAR STATION, UNIT 3 SUMMARY OF COMPLIANCE ELEMENTS FOR ORDER EA-12-049

The elements identified below, along with the Overall Integrated Plan (OIP) (Reference A2), the 6-Month Status Reports (References A4 thru A9) and additional docketed correspondence demonstrates Oconee Nuclear Station (ONS) Unit 3 compliance with Order EA-12-049 (Reference A1).

STRATEGIES - COMPLETE

ONS Unit 3 strategies are in compliance with Order EA-12-049. All strategy related Open Items, Confirmatory Items or Audit Questions/Audit Report Open Items have been addressed and are considered complete pending NRC closure.

MODIFICATIONS - COMPLETE

The modifications required to support the FLEX strategies for ONS Unit 3 have been fully implemented in accordance with the station design control process.

EQUIPMENT – PROCURED AND MAINTENANCE & TESTING - COMPLETE

The equipment required to implement the Mitigation Strategies has been procured and is ready for use at ONS Unit 3. Testing and maintenance processes have been established through the use of industry endorsed Electric Power Research Institute (EPRI) guidelines and the ONS Preventative Maintenance program such that FLEX equipment reliability is achieved.

PROTECTED STORAGE - COMPLETE

The storage facility required to implement the FLEX strategies for ONS Unit 3 has been completed and provides protection from the applicable site hazards. The equipment required to implement the FLEX strategies for ONS Unit 3 is stored in its protected configuration and is ready for use.

PROCEDURES - COMPLETE

FLEX Guidelines (FGs) for ONS Unit 3 have been developed in accordance with NEI 12-06, Revision 0, Section 3.2.2 (Reference A12). The FGs and affected existing procedures have been verified and are available for use in accordance with the site procedure control program.

TRAINING - COMPLETE

Training for ONS Unit 3 has been completed using the ONS Systematic Approach to Training (SAT) as recommended in NEI 12-06, Revision 0, Section 11.6.

STAFFING - COMPLETE

The staffing study for ONS has been completed in accordance with NEI 12-01, Revision 0 (Reference A13) and Recommendation 9.3 of the 10 CFR 50.54(f) letter, "Request for Information Pursuant to Title 10 of the Code of Federal Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," (Reference A10) and confirmed that ONS has adequate staffing to perform the actions to mitigate beyond design basis events. The ONS study is documented by letter dated June 17, 2015 (Reference A11).

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OCONEE NUCLEAR STATION, UNIT 3 SUMMARY OF COMPLIANCE ELEMENTS FOR ORDER EA-12-049

NATIONAL SAFER RESPONSE CENTERS - COMPLETE

Duke Energy has established a contract with the Pooled Equipment Inventory Company (PEICo) and has joined the Strategic Alliance for FLEX Emergency Response (SAFER) Team Equipment Committee for off-site facility coordination. It has been confirmed that PEICo is ready to support ONS with Phase 3 equipment stored in the National SAFER Response Centers in accordance with the site specific SAFER Response Plan.

VALIDATION - COMPLETE

Duke Energy has performed a validation in accordance with industry developed guidance which assures that required tasks, manual actions and decisions for FLEX strategies are feasible and can be executed.

FLEX PROGRAM DOCUMENT - ESTABLISHED

The FLEX Program Document for ONS has been developed in accordance with the requirements of NEI 12-06, Revision 0.

REFERENCES

A1. Nuclear Regulatory Commission Order Number EA-12-049, Order Modifying Licensees With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0, dated March 12, 2012, ADAMS Accession No. ML12054A735.

A2. Oconee Nuclear Station's *Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify Licenses With Regard To Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order EA-12-049)*, dated February 28, 2013 (Accession No. ML13063A065).

A3. Oconee Nuclear Station, Units 1, 2, and 3, Interim Staff Evaluation Regarding Overall Integrated Plan in Response to Order EA-12-049, dated February 10, 2014 (Accession No. ML13365A258).

A4. Oconee Nuclear Station First Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 29, 2013 (Accession No. ML13246A009).

A5. Oconee Nuclear Station Second Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2014 (Accession No. ML14064A197).

A6. Oconee Nuclear Station Third Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 27, 2014 (Accession No. ML14245A019).

A7. Oconee Nuclear Station Fourth Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 27, 2015 (Accession No. ML 15063A027).

A8. Oconee Nuclear Station Fifth Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 26, 2015 (Accession No. ML15247A068).

A9. Oconee Nuclear Station Sixth Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 29, 2016 (Accession No. ML16064A091).

A10. 10 CFR 50.54(f), "Request for Information Pursuant to Title 10 of the Code of Federal Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force review of Insights from the Fukushima Dai-ichi Accident", Recommendation 9.3, dated March 12, 2012, (Accession No. ML12053A340).

A11. Oconee Nuclear Station NEI 12-01 Phase 2 Staffing Assessment Report in Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness - Staffing, Requested Information Items 1, 2 and 6 -Phase 2 Staffing Assessment, dated June 17, 2015 (Accession No. ML15176A343).

A12. NEI 12-06, Revision 0 "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide."

A13. NEI 12-01, Revision 0 "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities."

A14. Oconee Nuclear Station, Unit 2 - Notification of Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" for Oconee Nuclear Station, Unit 2 (Accession No. ML16028A194).

ATTACHMENT 2

OCONEE NUCLEAR STATION UNIT 3, NRC AUDIT REPORT OPEN AND PENDING ITEMS

Duke Energy considers ONS Unit 3 to be in full compliance with Order EA-12-049 as demonstrated by the docketed correspondence concerning this order. Briefly, ONS Unit 3 FLEX Interim Staff Evaluation (ISE) Open and Confirmatory Items are complete pending NRC closure; ONS Unit 3 FLEX OIP Open Items are complete pending NRC Closure; ONS Unit 3 FLEX Audit Questions are complete pending NRC closure; ONS Unit 3 FLEX NRC Audit Report Open Items are complete pending NRC closure.

The following provides Duke Energy's summary response for the Audit Report Open and Pending Items and considers these items to be complete with respect to establishing compliance for ONS Unit 3:

Item	Description	Summary Response
ISE OI 3.2.1.1.A	Provide a description and justification for the specific evaluation model(s) used in the ELAP analyses for Oconee.	A response for this tracker item is included in Section 8.5.2 of station calculation 10937-02. The response provides a description for the specific evaluation models used in the Oconee ELAP analyses. Also included are references for the associated Duke Energy topical reports covering the methodology used, and references for the SERs [Safety Evaluation Reports] associated with these methodology reports.
ISE OI 3.2.1.6.C	When further analyses are completed, the licensee should provide additional information that either supports a conclusion that pressurizer relief or safety valves do not lift during the ELAP event or that lifting of the valve(s), if it occurs, is acceptable.	Section 8.5.2 of station calculation 10937-02 explains that the pressurizer PORV (or safety valves) are expected to lift during the initial 20 minutes of an ELAP event beginning from full power conditions. Once steam generator feed flow is established from the SSF, additional valve lifts are not anticipated. These pressurizer relief valve lifts occur while the pressurizer responds to design basis accident conditions, and is well within the design of the equipment. The initial transient evolution to an ELAP event mitigated by the SSF is consistent with other existing design basis analyses. The following clarification was provided during the July 2015 NRC onsite audit (and updated on the SE Tracker). A planned action has been created to incorporate this clarification in future revisions of station calculation 10937: The Oconee DBDs do not include information that indicates the PORV is rated for two-phase flow. The Oconee PORVs, 2.5" Dresser model 31533VX-30 Electromatic Relief Valves, were included in the EPRI safety valve testing program, and subjected to subcooled liquid relief. The associated EPRI report indicates the Oconee PORV did close under two-phase conditions, and subsequent evaluation showed the valve was not damaged. The Oconee mitigating strategy does not use the PORV for event mitigation, after the initial transient response before steam generator cooling is established. During the initial period where PORV cycling can be postulated, steam relief at normal operating conditions is anticipated. Liquid relief is not expected during this time frame.

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Item	Description	Summary Response
ISE OI 3.2.1.6.D	Provide additional information demonstrating successful mitigation of an ELAP event involving an uncontrolled cooldown resulting from consequential damage to the main steam system due to the severe natural hazard that initiates the ELAP event.	The Duke response to this SE tracker item, which is a follow up to RAI 50 (Section 8.5.2 of 10937-02), is included in station calculation 10937-02. The base case for a FLEX main steam line break at Oconee is considered to be a single main steam line break [MSLB] without credit for AFIS actuation. Additional MSLB scenarios have been evaluated successfully as part of the FLEX analyses and are included in station calculation 10937-02. The sensitivity runs include scenarios that result in initial overcooling, which has been demonstrated to be mitigated by use of the SSF and the guidance contained in Abnormal Procedure 25 (AP/25). A planned action has been created to incorporate the base case for a FLEX steam line break at Oconee into calculation 10937.
ISE CI 3.2.1.1.B	Confirm that the final ELAP computer code analyses for core cooling, reactor coolant system inventory, shutdown margin, and containment integrity have acceptable methodology and assumptions and support the sequence of events timeline.	Section 8.5.2 of station calculation 10937-02 contains a response for this tracker item. The response reviews the computer codes and methodologies used for the NSSS and containment response separately, and provides references for the associated Duke Energy topical reports covering the methodology used, and references for the SERs [Safety Evaluation Reports] associated with these methodology reports. The timelines for the seismic response scenario [T=0 no warning event] and the flood response scenario[warning time event] are identified and included as Attachment 7 to station calculation 10937-02. These timelines are reviewed and compared to the cases performed in station calculation 10937-02.

ATTACHMENT 2
OCONEE NUCLEAR STATION UNIT 3, NRC AUDIT REPORT OPEN AND PENDING ITEMS

Item	Description	Summary Response
ISE CI 3.2.1.2.B	Confirm that RCP seal temperature would be maintained at an acceptably low value by establishing injection flow to the RCP seals via the SSF RCMU pump within 20 minutes of event initiation.	Attachment 19 to station calculation 11383-00, specifically addresses this concern. An excerpt from the conclusion portion of the attachment is provided below: "Oconee Design Basis Events documentation (Appendix C of DBD 0254.00-00-4005) and the SSF RC Makeup System documentation (Section 2.2.2, of DBD 0254.00-00-1004) establishes 20 minutes as the time to establish SSF RC Make Up to the RCP seals in order to limit seal heat-up and prevent seal damage or failure. In addition to reestablishing seal cooling flow, these documents establish 15 minutes for the time to isolate Unit 1 RCP seal return flow and 20 minutes for Units 2 & 3. For Events with no warning (T=0) SSF RC Makeup is started from the SSF per Abnormal Procedure 25 (AP/25). Input 5.34 from Station Calculation 5372 provides much of the technical basis. For the Advanced Warning Time event (Jocassee Dam failure), Case 3, provides a methodology in which substantial unit shutdown and cooldown to less than 350F is accomplished prior to the ELAP condition. In this case the primary system is cooled down using normal station equipment on all three units to preclude seal damage. There is no requirement to establish SSF RCMU to provide seal protection." An analysis is in progress (with a planned action) to determine expected water temperature profile at the seal surfaces during the time period between loss of power to the reactor coolant pumps (RCPs) with loss of seal cooling flow and restoration of seal cooling flow from the SSF Reactor Coolant Makeup Pump (RCMUP).

Item	Description	Summary Response
ISE CI 3.2.1.2.C	Confirm there is justification for the assumed seal leakage rates for the Bingham RCPs with Sulzer seal assemblies.	Attachment 19 of station calculation 11383-00 specifically addresses this concern. An excerpt from the conclusion portion of the attachment is provided below: "Based on the ONS FLEX strategies there is no expectation of increased Sulzer RCP seal leakage due to the early event response. Additional review of testing and correspondence with Sulzer provides additional confirmation that the Unit 2&3 seals are tolerant of the short duration temperature excursion. The modeled leakage rates are arbitrary, with the 2 gpm per seal selected from WCAP-17601-P section 4.4.3 as values used in Generic B&W calculations as "normal leakage for seals that have not experienced overheating", and the 21 gpm per seal selected as representative of a large seal leak, also selected based on documentation from the same WCAP. Based on the credible failure mode (elastomers exposed to high temperatures) and the mechanism of temperature to time exposure, there is adequate justification for leakage values selected for the base case and the high leakage sensitivity case." An analysis is in progress (with a planned action) to determine expected water temperature profile at the seal surfaces during the time period between loss of power to the reactor coolant pumps (RCPs) with loss of seal cooling flow and restoration of seal cooling flow from the SSF Reactor Coolant Makeup Pump (RCMUP).
ISE CI 3.2.1.2.D	Confirm there is justification for the assumed seal leakage rates for the Westinghouse 93-A RCPs with Flowserve N-9000 seals with the Abeyance feature.	Attachment 19 of station calculation 11383-00 specifically addresses this concern. An excerpt from the conclusion portion of the attachment is provided below: "Based on the ONS FLEX strategies there is no expectation of increased Flowserve RCP seal leakage due to the early event response. Additional review of the Flowserve White Paper (Ref. 7) provides additional confirmation that the Unit 1 seals are tolerant of the short duration temperature excursion. The modeled leakage rates are arbitrary, with the 2 gpm per seal selected from WCAP-17601-P section 4.4.3 as values used in Generic B&W calculations as "normal leakage for seals that have not experienced overheating", and the 21 gpm per seal selected as representative of a large seal leak, also selected based on documentation from the same WCAP. Based on the credible failure mode (elastomers exposed to high temperatures) and the mechanism of temperature to time exposure, there is adequate justification for leakage values selected for the base case and the high leakage sensitivity case (Note: ONS Unit 1 RCP seals have the Generation 1 Abeyance Feature)." Additionally, the NRC endorsed the Flowserve Corporation report entitled "White Paper on the Response of the N-Seal Reactor Coolant Pump (RCP) Seal Package to Extended Loss of All Power (ELAP)," Revision A (ML15222A356) on November 12, 2015.

ATTACHMENT 2

OCONEE NUCLEAR STATION UNIT 3, NRC AUDIT REPORT OPEN AND PENDING ITEMS

Item	Description	Summary Response
ISE CI 3.2.1.6.E	When evaluations are completed, confirm that the survivability and performance of the atmospheric dump valves is adequate to support Oconee's mitigation strategy.	Refer to Attachments 9 and 10 of station calculation 11383-00 for conclusion of survival and accessibility for implementation of FLEX strategies.
SE 20-E	Please (1) state the ambient conditions (temperature, pressure, humidity) under which the SSF RCMU pumps are qualified or otherwise expected to function and provide a basis, (2) state the expected conditions in containment during the period when the functionality of the SSF RCMU pumps is credited and provide a basis, and (3) confirm that the credit taken for the SSF RCMU pumps under ELAP conditions is justified.	(1) In accordance with the Oconee SSF RCSMU Design Basis Document and Oconee Environmental Qualification Calculation, the RCMU Pumps will operate in ambient conditions of 267 degrees F, 41.8 psig, and 0-100% humidity. (2) In accordance with the Oconee ELAP Containment Response Calculation, each of the FLEX cases which utilize RCMU pump strategy exhibits a similar trend in the containment response with each case reaching 100% humidity, a temperature of 170 – 185 deg. F, and a pressure response of 18 to 21 psig at the end of the simulation. The simulation was for 72 hours. It is expected that the containment pressure and temperature trends will stabilize shortly after the conclusion of the 72 hour simulation. Oconee expects to be capable of transitioning to Phase 2 RCS Makeup (with portable diesel pump) well in advance of 72 hours. (3) By comparison, the peak conditions expected during the ELAP event remain below or equal to the pump's design basis conditions.