

50-269/270/287



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

November 18, 1999

Mr. William R. McCollum, Jr.  
Vice President, Oconee Nuclear Site  
Duke Energy Corporation (Duke)  
P. O. Box 1439  
Seneca, SC 29679

**SUBJECT: STATUS OF OPEN AND CONFIRMATORY ITEMS FROM JUNE 16, 1999,  
SAFETY EVALUATION REPORT FOR DUKE'S LICENSE RENEWAL  
APPLICATION FOR OCONEE UNIT NOS. 1, 2 AND 3**

Dear Mr. McCollum:

On October 28, 1999, the Nuclear Regulatory Commission (NRC) staff held a public meeting with representatives of Duke Energy Corporation (Duke) at Rockville, Maryland, to discuss the progress of the NRC staff's review of Duke's License Renewal Application for its Oconee Nuclear Station, Units Nos. 1, 2, and 3. During the meeting, both the NRC and Duke agreed that the staff would provide feedback to Duke regarding the status of safety evaluation report (SER) open and confirmatory items based on Duke's responses to these items by letter dated October 15, 1999. There are also several other items that the staff stated it would review to determine if any additional issues needed to be resolved prior to issuance of the final safety evaluation report for the Oconee license renewal application. These items included the following:

- questions related to Duke's September 30, 1999, submittal that amended the license renewal application based on changes to the Oconee current licensing basis that materially affected the contents of the application
- the Duke comments on the SER contained in the October 15, 1999, letter
- the aging management program for insulated cables and connections that was identified to Duke in a letter dated October 5, 1999
- issues raised as a result of an October 27, 1999, letter to the Babcock and Wilcox Owners Group related to topical report BAW-2251 "Demonstration of the Management of Aging Effects for the Reactor Vessel"
- issues raised as a result of an October 27, 1999, letter to Duke that identified the renewal applicant action items for BAW-2248 "Demonstration of the Management of Aging Effects for the Reactor Vessel Internals"

The purpose of this letter is to provide Duke with the status regarding any items that are not resolved based on the review of the documents mentioned above. The staff has tentatively scheduled a meeting with Duke for December 9, 1999, to discuss the resolution of these issues.

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The enclosure identifies the items that the staff believes need to be resolved and the basis for the item remaining open at this time.

Sincerely,

**Original Signed By**

Joseph M. Sebrosky, Project Manager  
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Docket Nos. 50-269, 50-270, and 50-287

Enclosure: As stated

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## Open Items Related to the Review of the Oconee License Renewal Application

### Safety Evaluation Report (SER) open item 2.1.3.1-1

This issue involves the scoping process that Duke used to comply with the requirements of 10 CFR 54.4. The staff issued a resolution plan for this item on October 8, 1999, and there was a public meeting held with Duke on October 28, 1999, to discuss the item. The meeting summary dated November 4, 1999, notes that Duke is to provide additional information to resolve this issue by November 30, 1999. The staff still considers this item open because Duke has to provide the information discussed in the October 28, 1999, meeting.

### SER open item 2.2.3-1

The issue relates to whether or not the recirculated cooling water system should be considered to be within scope of license renewal. This item was also discussed during the October 28, 1999, meeting. Duke is to provide additional information to resolve this issue by November 30, 1999. The staff still considers this item open because Duke has to provide the information discussed in the October 28, 1999, meeting.

### SER open item 3.0-1

This issue relates to the form and content of the final safety analysis report supplement for the license renewal application. There have been a series of meetings with Baltimore Gas and Electric and Duke Energy Corporation to discuss this item. Because the staff and Duke have not yet reached agreement on the resolution of this item for Oconee the staff still considers this item to be open.

### SER open items 3.4.3.3-3, 3.4.3.3-4, and 3.4.3.3-5

These SER open items relate to management of cracking for non-bolted reactor vessel internal components, inspection of baffle-former bolts, and the loss of fracture toughness in cast austenitic stainless steel from synergistic thermal and neutron embrittlement, respectively. Duke's October 15, 1999, letter provides a response to these open items and a description of the Reactor Vessel Internals Aging Management Program. The Reactor Vessel Internals Aging Management Program proposes to do a one-time inspection for Reactor Vessel Internals - Baffle Bolts, Reactor Vessel Internals - Inspection of Non-Bolted Items, and Reactor Vessel Internals - Inspection of Cast Austenitic Stainless Steel RVI items (see pages 88, 89, and 90 of the October 15, 1999, letter).

The staff does not believe that one-time inspections for these items are appropriate. Rather, the staff believes that the inspections should continue into the period of extended operation, consistent with the existing ASME Section XI inspection program. On this basis, the staff considers these items to be open.

Enclosure

SER open item 3.4.3.3-9

This issue was added after the SER for Oconee was issued, and is discussed in a letter dated October 27, 1999, written to the Babcock and Wilcox Owners Group. The issue involves treatment of the reactor vessel monitoring pipes in BAW-2251 "Demonstration of the Management of Aging Effects for the Reactor Vessel." The staff and Duke have had several conversations subsequent to the October 27, 1999, letter. Currently the staff's issues with the reactor vessel monitoring pipes are the following:

- a. What is the applicant's experience with the reactor vessel leak-off line, including any indications of degradation, inspection results, etc.? Is there any indication that stagnant water may collect in any portions of the piping?
- b. Are there any existing aging management measures, such as blowing the line clear after refueling, walkdowns, etc., that could serve to indicate the presence of or mitigate the potential for degradation? Is the reactor vessel leak-off line visually accessible?
- c. In the proposed response to the reactor vessel monitoring pipe issue, Duke mentions that the lines are seismic as well as labeled Class BC. Please describe piping Class BC and why the lines are not considered Class 1.

Until the above questions are resolved the staff considers this item to be open for the Oconee license renewal SER.

SER open item 3.6.1.3.1-1

This issue involves the aging effects of heating ventilation and air conditioning sub-component parts of vibration isolators. In a phone call with Duke on October 27, 1999, the staff questioned Duke's portion of the response regarding the auxiliary building ventilation system. The staff stated that Duke had the following 4 options to resolve the issue for the auxiliary building ventilation system: revisit whether or not the system is within the scope of license renewal, provide an aging management program for the elastomers in the system, provide a more rigorous analysis for why failure of the elastomers would not fail the intended function of smoke removal, or consider the elastomers a consumable.

Duke has not responded to the options presented during the October 27, 1999, phone call, therefore, the staff considers this to be an open item.

SER open item 3.9.3-1

This item was added after the SER for Oconee was issued. The item is discussed in a letter that was sent to Duke on October 8, 1999, and involves the aging management program for insulated cables and connections. Duke provided a proposed response to the staff on November 5, 1999, and the staff and Duke had a phone call on November 10, 1999, to discuss the issue. The phone call and Duke's proposed response are discussed in a summary dated November 18, 1999. The following is a brief synopsis of why the staff believes this issue remains open and the questions that need to be answered in order to resolve the issue.

The staff review of the November 5, 1999, draft response to OI 3.9.3-1 identified several concerns that need to be addressed by Duke in order to resolve this open item. The proposed cables and connections inspection program is too limited and needs to be expanded to include non-EQ instrumentation, control, and power cables that are within scope for license renewal and not only those that were identified in NRC Inspection Report 99-12. The proposed inspection

program by Duke is limited to black instrumentation cables in the reactor building associated with a feedwater line and those next to a steam generator or the pressurizer.

In addition, heat-shrink tubing on pressurizer cable connectors is included in the inspection program. The program is limited only to a visual inspection for signs of accelerated aging such as discoloration and cracking. Cables that are inaccessible such as those that are directly buried or in conduits will not be inspected for aging with this program. In addition, the inspection program does not contain any provisions for periodic monitoring of changes to the service environments for localized hot spots (radiation or temperature) or moisture/water accumulation in conduits or trenches that may develop and result in unacceptable aging. In summary, the staff believes that the following areas need to be addressed in Duke's proposed cables and connections inspection program:

1. Expansion of the inspection program to include non-EQ cables (instrumentation, control, and power) and connections located in the Reactor Buildings, Auxiliary Buildings, Turbine Buildings, and Standby Shutdown Facility that are subject to the applicable aging effects of heat, radiation, and moisture.
2. Further investigation of the cable condition where visual observations of cable aging have shown cable surface anomalies such as discoloration, cracking or surface contamination. Acceptance criteria need to be established for visual inspections.
3. Electrical measurements on selected cables that are inaccessible or directly buried to detect aging due to radiation, temperature, or moisture.
4. Periodic monitoring of service environments of cables and connections for radiation or temperature hot spots or moisture/water accumulation in conduits or trenches.

SER Comment Number 3 of Duke's October 15, 1999, letter

In its October 15, 1999, submittal Duke identified that the staff's SER did not address Duke's discussion of leak-before-break (LBB). Duke had previously provided information regarding LBB in response to request for additional information (RAI) 5.4.1-1. Duke's response to this RAI is contained in a letter dated February 17, 1999. The staff subsequently reviewed the LBB discussion in Duke's response to RAI 5.4.1-1 and finds the following additional information is necessary in order for the staff to address this issue in the license renewal SER.

1. Confirm that per the application of BAW-1847, Revision 1, Oconee Nuclear Station has applied Leak-Before-Break (LBB) technology only to the facility's Main Coolant Loop piping for the purpose of eliminating the dynamic effects of pipe rupture. Also, state whether any of the facility's reactor coolant system branch piping (surge line, core flood line, decay heat line, etc.) has been subsequently approved for the application of LBB.
2. In your response to our RAI, you note that you have used LBB to resolve an issue regarding "a recently discovered inconsistency between the Mark-B fuel assembly horizontal faulted condition analyses and ECCS calculations." Confirm that the application of LBB for this purpose is covered under the items for which staff review and approval was granted in its original SER on LBB, or explain how you determined that you could apply LBB to resolve these issues without again requesting staff review and approval.
3. In your response, you note that a fatigue flaw growth analysis was included in BAW-1847, Revision 1, but not included in the TLAA assessment of your license renewal

application. You indicate that your rationale for not revisiting this issue for the license renewal period was that the requirement was not present in the NRC staff's Draft Standard Review Plan (DSRP) Section 3.6.3 on LBB. While the staff concurs that this fatigue flaw growth analysis has never been demonstrated to be a concern when LBB was sought over the period of an initial licensee, it remains to be demonstrated that it is not a concern when the period of operation is extended to 60 years. Provide an analysis which demonstrates that fatigue flaw growth does not affect the basis for concluding that LBB remains applicable for the piping at Oconee for which LBB has been previously approved when extended operation is accounted for.

4. You also note in your February 17, 1999, response to RAI 5.4.1-1 that as part of your application of LBB to resolve the issues stated in question #2 above, you concluded that additional information had been acquired on the aging of cast austenitic stainless steel materials since the time of BAW-1847, Revision 1. You state that based on the work of Chopra and Shack [NUREG/CR-6177] the original assumption in BAW-1847, Revision 1, the ferritic material properties assumed to bound the aged cast stainless steel properties may be non-conservative. You also note that you reanalyzed the LBB behavior of the cast stainless steel reactor coolant pump suction and discharge nozzles based on the use on the new information from NUREG/CR-6177.

Provide the results of your analysis demonstrating that the appropriate margins for LBB continue to be met when the new information on the aging of cast stainless steel is accounted for.

5. As part of the reanalysis cited in question #4, was the aging of stainless steel weld materials also reevaluated? Information on this topic can be found in NUREG/CR-6428 by Gavenda, et. al. This issue would be of significance if stainless steel shielded metal arc welds or submerged arc welds were used in the construction of the LBB-approved lines in the Oconee reactor coolant system.

Comments Number 1, and 8 of Duke's October 15, 1999, letter

The staff does not believe that it needs any additional information from Duke regarding these items. However, the staff believes that it needs to discuss with Duke how it intends to resolve these comments during the December 9, 1999, meeting.

Comment Number 4 of Duke's October 15, 1999, letter

With respect to item No. 4, the staff does not need any additional information to develop its final SER. In a conference call on November 17, 1999, your staff clarified that corrective actions, and confirmatory process elements of aging management preventive maintenance (PM) activities, will be implemented under the Problem Investigation Process (PIP), which is a 10 CFR Part 50, Appendix B, program. Conversely, administrative controls relating to these PM activities will not be implemented under Appendix B. However, including a description of the aging management PM activities in the UFSAR supplement with a sufficient description and a discussion that identifies the need for these activities to manage aging during the period of extended operation for the purpose of license renewal should provide the necessary administrative controls for the staff to make a reasonable assurance finding.

With respect to NRC Inspection Report 99-012, the discussion entitled "Quality Assurance Relationship to Preventive Maintenance," the staff is concerned with the potential that corrective actions and confirmatory process elements resulting from aging management PMs will not receive the necessary priority to ensure that the intended function will be maintained throughout



the period of extended operation. The process allows for prioritization of corrective actions based on subjective criteria that currently does not specifically consider non-safety-related structures and components that require aging management. This absence of a license renewal grouping under the PIP can lead to corrective actions and confirmatory process elements of aging management PM activities being assigned a low priority such that aging management corrective and confirmatory activities may not be implemented in a timely manner. Members of your staff recognized the need for changes in the existing program, and will address this concern under the inspection open item. This item can be discussed during the upcoming management meeting.

Issue associated with Duke's September 30, 1999, letter

Duke's September 30, 1999, letter amended the license renewal application based on changes to the Oconee current licensing basis that materially affected the contents of the application. In the September 30, 1999, letter Duke add several systems, structures, and components to the scope of license renewal. The staff has the following question related to the portions of the component cooling water system that were added as a result of the revised steam generator tube rupture analysis.

The staff used diagram OLRFD 144A-1.2 to complete the review of the additional components subject to AMR for the component cooling water system. Two sets of heat exchangers are included on those diagrams but are not identified on Table 2-1 as being within the scope of license renewal. These components are the Quench Tank Heat Exchanger and the two Letdown Coolers.

Please indicate whether these components and their associated piping and valves are within the scope of license renewal and whether they are listed on Table 2-1. If these components are not within scope, state the boundary of the Component Cooling water system using OLRFD 144A-1.2, and identify the components that provide pressure boundary isolation.

SER open item 3.1.1-1 and the aging management review associated with Duke's 9/30/99 letter

The staff and Duke have had several discussions regarding Duke's response to SER open item 3.1.1-1 and the aging management review for systems and components contained in Duke's September 30, 1999, letter. Based on a preliminary review the staff believes that Duke's responses to the staff's follow-on questions have resolved these issues with the exception of the question listed below.

1. The Keowee Turbine Guide Bearing Oil Cooler intended function described in Duke's letter dated October 15, 1999, conflicts with the description of the component on page 2.5-32 of the LRA. The LRA describes the cooler as having a heat transfer function. Table 2.5-23 of the LRA also lists the component as having a heat transfer function.

Explain why the response to open item 3.1.1-1 is inconsistent with the description of the cooler contained in section 2.5.13.8 of the LRA. If the cooler does not have a heat transfer function, discuss the capability of the Keowee Turbine Generator to perform its intended function without cooling to the Turbine Guide Bearing Lube Oil system.

In addition, the staff has not had time to fully review all of the responses associated with SER open item 3.1.1-1 and the aging management review contained in Duke's September 30, 1999, letter. If the staff requires additional information beyond that identified above it will inform Duke by December 3, 1999, so that the information can be discussed during the December 9, 1999, meeting.

### Renewal Applicant Action Items Associated with BAW-2248

In an October 27, 1999, letter the staff identified to Duke the proposed renewal applicant action items associated with BAW-2248, "Demonstration of the Management of Aging Effects for the Reactor Vessel Internals." In subsequent discussions with Duke it has been determined that the following 2 renewal applicant action items need to be addressed by Duke before the staff can consider issues associated with this topical report resolved. Note that due to internal comments applicant action item #4 has been slightly reworded from the version that existed in the October 27, 1999, letter.

Applicant Action Item # 4 - Applicants must commit to participation in the B&WOG RVIAMP, and any other industry programs as appropriate, to continue the investigation of potential aging effects for RVI components and to establish monitoring and inspection programs for RVI components. The applicant shall provide the NRC with either annual reports or periodic updates (after completion of significant milestones) on the status of the RVIAMP, commencing within one year of the issuance of the renewed license.

Applicant Action Item #8 - The applicant must describe plans for management of stress relaxation for bolted closures of the RVI. This description should specify the critical locations, and monitoring and inspection techniques, and timing of the inspection, or the process to be used to specify these items.

### Confirmatory Items

In addition to the open issues identified above the staff and Duke have reached agreement on revisions to two SER open items that would resolve the staff's concerns for these open items. Duke needs to submit these revised responses in writing. The staff therefore considers these items to be confirmatory in nature. The items that fall into this category are SER item 2.2.3.6.1.2.1-1, and 4.2.2.3-1.