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SUBJECT: Forwards responses to staff requests for info re listed sections of Exhibit A of 980706 application for renewal of licenses DPR-38,DPR-47 & DPR-55.

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January 25, 1999

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

Subject: License Renewal
Response to Requests for Additional Information
Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

By letter dated July 6, 1998, Duke Energy Corporation submitted an Application for Renewed Operating Licenses for Oconee Nuclear Station, Units 1, 2, and 3 (Application). Exhibit A of the Application contains the technical information required by 10 CFR Part 54. The NRC staff is reviewing the information provided by Duke Energy in the Application and by several letters identified areas where additional information is needed to complete its review.

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Attachment 1 contains our responses to staff requests for information concerning the following sections of Exhibit A of the Application: 2.2, 2.4, 2.5.3, 2.5.5, 2.5.6, 2.5.7, 2.5.8, 2.5.9, 2.5.10, 2.5.13, 3.4.10, 3.5.3, 3.5.6, 3.5.7, 3.5.8, 3.5.13, 3.5.14, and 4.21. None of these responses contains any new commitments.

If there are any questions, please contact Bob Gill at 704-382-3339.

Very Truly Yours,

W. R. McCollum Jr., Site Vice President
Oconee Nuclear Station

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P PDR

W. R. McCollum, Jr., being duly sworn, states that he is Vice President, Oconee Nuclear Station, Duke Energy Corporation, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission these responses to NRC requests for additional information concerning the Application to Renew the Facility Operating Licenses of Oconee Nuclear Station submitted by letter dated July 6, 1998; and that all statements and matters set forth herein are true and correct to the best of his knowledge and belief. To the extent that these statements are not based on his personal knowledge, they are based on information provided by Duke employees and/or consultants. Such information has been reviewed in accordance with Duke Energy Corporation practice and is believed to be reliable.

W. R. McCollum, Jr., Vice president
Oconee Nuclear Site

Subscribed and sworn to before me this 25 day of January 1999.

Notary Public

My Commission Expires:

2-12-2002

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ATTACHMENT 1
Oconee Nuclear Station
Application for Renewed Operating Licenses
Responses to NRC Requests for Additional Information (RAI)

SET #02
January 25, 1999

Exhibit A, Section 2.2, Identification of Systems, Structures, and Components within the Scope of License Renewal

RAI 2.2-7 (12/2/98E)
Radiation monitors typically perform safety-related functions, such as, providing signals that isolate control room ventilation. Radiation monitors have not been identified as being within the scope of license renewal on Oconee OLRP-1002 drawings. Provide a basis why the radiation monitors are not considered within the scope of license renewal and, therefore, not subject to an aging management review. Alternatively, identify where in the application these monitors have been addressed, if they have been addressed elsewhere.

Response to RAI 2.2-7
Radiation monitors shown on the OLRP series of drawings (OLRFD-116C-1.1, OLRFD-124B-1.5, OLRFD-133A-1.5) do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the radiation monitors are excluded from the scope of license renewal.

Exhibit A, Section 2.4, Reactor Coolant System Mechanical Components and Class 1 Supports

RAI 2.4-1 (11/30/98C)
Dwg. #s OLRFD-107A-1.1, 2.1 and 3.1 of the submittal shows the pressurizer quench tank with the sparger. Please clarify if the sparger nozzles are within the scope of license renewal. If they are not, provide the basis for their exclusion.

Response to RAI 2.4-1
Sparger nozzles within the Coolant Storage System are within the scope of license renewal and subject to an aging management review. They are listed as "Spray Nozzles" in Tables 2.5-11 and 3.5-5 of Exhibit A of the Application.

Exhibit A, Section 2.5.3, Containment Heat Removal Systems

RAI 2.5.3-5 (12/1/98A)

Clarify why Flow Diagrams OLRFD-102A-1.2, 2.2 and 3.2 which illustrate all the components shown on Figure 6.2, "Flow Diagram of Reactor Building Spray System," of the Oconee FSAR have not been included in Table 2.5-2, "Flow Diagrams Indicating Evaluation Boundaries of Containment Heat Removal Systems." Specifically, the diagrams that show valves LP-15 and LP-16 and the supply from the decay heat removal pumps are not included in Table 2.5-2 of OLRP-1001.

Response to RAI 2.5.3-5

Oconee License Renewal Flow Diagrams OLRFD-102A-1.2, 2.2, and 3.2 do not illustrate the components of the Reactor Building Spray System. Rather, they illustrate the Low Pressure Injection (LPI) pump discharge and are listed in the LPI Section of Table 2.5-6 of Exhibit A of the Application. This portion of LPI serves as a suction source for Reactor Building Spray System, but system boundary flags on Drawing OLRFD-102A-1.1 at drawing locations (C-11, F-11) indicate that valves LP-15 and LP-16, the decay heat removal pumps, and associated piping and components are within the LPI system boundary. The UFSAR drawings are summary drawings and provide a simplified presentation of actual system design, often combining portions of more than one system on one drawing.

Exhibit A, Section 2.5.5, Emergency Core Cooling Systems

RAI 2.5.5-4 (11/30/98C)
Flow restriction orifices are installed in several pipes in order to limit the mass flow rate during an accident. Clarify if these orifices are within the scope of license renewal? If so, provide a cross reference to where these items are discussed in the submittal. If not, provide the basis for their exclusion. Additionally, provide a discussion of the intended functions these items might perform for license renewal.

Response to RAI 2.5.5-4
Section 2.5.5 of Exhibit A of the Application includes the High Pressure Injection System, the Low Pressure Injection System and the Core Flood System. No orifices are within the license renewal portions of the Core Flood System. The orifices within the license renewal portions of the High Pressure Injection System and the Low Pressure Injection System are within the scope of license renewal and are subject to an aging management review. These orifices are listed in Table 2.5-7 of the Application. All orifices in the HPI and LPI systems have a component intended function of pressure boundary. Some orifices have the component intended function of throttling to limit mass flow rate. Some orifices are required to throttle flow for flow rate measurement. The aging management review for these orifices is presented in Section 3.5.5 of Exhibit A of the Application.

RAI 2.5.5-5 (11/30/98C)
Dwg. #s OLRFD-103A-1.1, 2.1 and 3.1 of the submittal shows the Low Pressure Injection system that provides water to the Reactor Building (Containment) Spray system. Clarify if the nozzles of this spray system are within the scope of license renewal? If so, provide a cross reference to where these items are discussed in the submittal. If not, provide the basis for their exclusion.

Response to RAI 2.5.5-5

Reactor Building Spray Nozzles are within the scope of license renewal and subject to an aging management review. They are listed as "Spray Nozzles" in the Reactor Building Spray System section of Tables 2.5-3 and 3.5-1 of Exhibit A of the Application.

Exhibit A, Section 2.5.6, Auxiliary Systems

RAI 2.5.6-1 (12/2/98C)
For valves SF1 and 2 (e.g., 104A-1.1, K10 and J9 for Unit 2), the drawing is not clear on whether they are within the scope of license renewal (WSLR). Piping up to the valves has been highlighted, yet the valves themselves are not highlighted. Indicate whether these valves are WSLR, and if not, provide a justification for their exclusion.

Response to RAI 2.5.6-1
Valves SF-1 and SF-2 are the spent fuel transfer tube isolation valves. These valves are within Oconee Pipe Class C piping and do fall within the scope of license renewal. These valves are encompassed within commodity group "VALVES" and are listed in Table 2.5-9 of Exhibit A of the Application. Highlighting and the license renewal boundary flags should have included these valves. This also applies to the Oconee Unit 3 drawing.

RAI 2.5.6-2 (12/2/98C)
Table 2.5-9 does not include the blank flanges that isolate the spent fuel pool transfer tube during plant operation. The components are indicated as being WSLR on flow diagram 104A-1.1, for example. Indicate whether these blank flanges are within scope, and if not, provide a justification for their exclusion.

Response to RAI 2.5.6-2
These blind flanges are within the scope of license renewal and are included in commodity group "PIPE". Oconee commodity group "PIPE" is listed in Table 2.5-9 of Exhibit A of the Application. For Oconee license renewal commodity group "PIPE" includes, but is not limited, to pipe, blind flanges, blank flanges, elbows, pipe fittings, thermowells, and quick disconnects.

RAI 2.5.6-3 (12/2/98C)
Diagram 121D-1.2 illustrates valves 3CCW-438 and 3CCW-98 and connected piping for Unit 3 and valves 1CCW-438 and 1CCW-244 and connected piping as WSLR; however, valves 2CCW-438 and 2CCW-246 are not highlighted WSLR for Unit 2. Indicate whether these valves are within scope, and if not, provide justification for their exclusion

Response to RAI 2.5.6-3
Valves 2CCW-438 and 2CCW-246 are within the scope of license renewal and subject to an aging management review. These valves are encompassed within commodity group

"VALVES" and are listed in Table 2.5-9 of Exhibit A of the Application. Highlighting and the license renewal boundary flags should have included these valves.

RAI 2.5.6-4 (12/2/98C)
The following components are highlighted as being WSLR, yet not included on Table 2.5-9:

1. Main Condenser cooling coil (e.g., 133A-1.2, location J2)

2. Emergency Feedwater pump turbine oil cooler (e.g., 133A-1.2, location I14)

3. Condensate Coolers (e.g., 133A-1.3, location F4)

Indicate whether these components are within the scope of license renewal or, if not, provide a justification for their exclusion.

Response to RAI 2.5.6-4
1. The main condenser is within the scope of license renewal and is listed in the Condensate System Section of Table 2.5-15 in Exhibit A of the Application.

2. From Section 2.2.1.1 of Exhibit A of the Application, safety related equipment were included within the scope of license renewal whether or not they meet the criteria of §54.4(a)(1) or (a)(2). As a result, the emergency feedwater pump turbine oil cooler only falls within the scope of license renewal because it is within Oconee Pipe Class F piping even thought the cooler does not serve a function as defined in §54.4(a)(1), (2), (3), or (b). Further analysis has shown that the loss of the pressure boundary of this cooler does not cause a loss of Condenser Circulating Water System intended function. Since the cooler does not perform a component intended function in support of a system intended function, the cooler is not subject to an aging management review and is not listed in Table 2.5-9 in the Application.

3. The condensate coolers are within the scope of license renewal and are listed in the Condensate System section of Table 2.5-15 in the Application.

RAI 2.5.6-5 (12/2/98C)
On Diagram 133A-3.1, in section D-5, valve 3CCW-341 separates sections of the CCW system WSLR and not WSLR. This valve is normally open. The valve itself is not designated as WSLR. How can the pressure boundary (i.e., intended function) be assured without this valve being WSLR?

Response to RAI 2.5.6-5
The highlighted piping and components up to valve 3CCW-341 are within the scope of license renewal because they support a function as defined in §54.4(a)(1), (2), (3), or (b). Valve 3CCW-341 and the piping and components after valve 3CCW-341 are not highlighted as within the scope of license renewal because they do not perform a function as defined in §54.4(a)(1), (2), (3), or (b). Analysis has shown that loss of the pressure boundary of these non-highlighted components would not affect Condenser Circulating Water System intended function to serve as a suction source for the Low Pressure Service Water System, High Pressure Service Water System and Auxiliary Service Water System due to the elevation of that portion of the system.

RAI 2.5.6-6 (12/2/98C)
On flow diagram 133A-3.1 section B5, piping downstream of valve 3CCW-342 is designated Duke class F piping, but is not highlighted WSLR? Please justify the exclusion of this piping.

Response to RAI 2.5.6-6
Piping downstream of valve 3CCW-342 is within the scope of license renewal and subject to an aging management review. This piping is listed in Table 2.5-9 of Exhibit A of the Application. Highlighting and the license renewal boundary flags should have encompassed this piping.

RAI 2.5.6-7 (12/2/98C)
On flow diagram 133A-1.4, the Unit 1 recirculating cooling water (RCW) coolers are highlighted as WSLR, yet on flow diagram 133A-3.1, the Unit 3 RCW coolers are not highlighted as WSLR. Table 2.5-9 includes the recirculating cooling water heat exchanger as a mechanical component and lists its intended function. Indicate whether the Unit 3 RCW coolers are WSLR, and if not, provide a justification for their exclusion.

Response to RAI 2.5.6-7
The Units 1 and 2 RCW coolers (Heat Exchangers) are within scope of license renewal. Their component intended function is to provide pressure boundary for the Condenser Circulating Water System. They are not required for heat transfer. Because the Condenser Circulating Water System configuration for Unit 3 differs from Units 1 and 2, the Unit 3 RCW Heat exchangers shown on OLRFD-133A-3.1 are not required for the Unit 3 Condenser Circulating Water System pressure boundary. Since the Unit 3 coolers do not support any Condenser Circulating Water System intended function as defined in §54.4(a)(1), (2), (3), or (b), they are excluded from the scope of license renewal.

RAI 2.5.6-8 (12/2/98C)
On flow diagram 133A-3.2 at location J-14, downstream of valve 3CCW-363 there is a blind flange that is not listed on Table 2.5-9, yet it is highlighted. Please indicate whether this pressure boundary component is WSLR, and include it in your evaluation for aging management, or justify its exclusion.

Response to RAI 2.5.6-8
These blind flanges are within the scope of license renewal and are included in the commodity group "PIPE". The commodity group "PIPE" is listed in Table 2.5-9 of Exhibit A of the Application. For Oconee license renewal, the commodity group "PIPE" includes, but is not limited, to pipe, blind flanges, blank flanges, elbows, pipe fittings, thermowells, and quick disconnects.

RAI 2.5.6-10 (12/2/98C)
The following components are not listed on Table 2.5-9, yet are identified as WSLR on the flow diagrams included in the parentheses:

1. Bearing and motor air coolers on the RCPs (e.g., L9, 100A-1.3),
2. Marbo tap (e.g., J8, 124B1.1), and
3. Quick disconnects (e.g., 124B-2.1, L5).

Indicate whether these components are within the scope of license renewal or, if not, provide a justification for their exclusion

Response to RAI 2.5.6-10

1. Bearing and motor air coolers are within the scope of license renewal but are not subject to an aging management review. Therefore, bearing and motor air coolers are not listed in Table 2.5-9 of Exhibit A of the Application. Bearing and motor air coolers are integral to the motor and Duke considers these components to be a sub-component of the motor. Per §54.21(a)(1)(i), motors are not subject to an aging management review. As a result, the bearing and motor air coolers are within the scope of license renewal but not subject to an aging management review since they are a part of the motor.

2. Marbo taps are within the scope of license renewal and subject to an aging management review. Since their physical characteristics are common to other piping commodities they are encompassed by the commodity group "PIPE" and are listed in Table 2.5-9 of Exhibit A of the Application.

3. Quick Disconnects are within the scope of license renewal and are encompassed by the commodity group "PIPE". The commodity group "PIPE" is listed in Table 2.5-9 of Exhibit A of the Application. For Oconee License Renewal, the commodity group "PIPE" includes, but is not limited to pipe, blind flanges, blank flanges, elbows, pipe fittings, thermowells, quick disconnect.

RAI 2.5.6-11 (12/2/98C)

The motor driven emergency feedwater pump motor air cooler piping down stream of the 1A and 1B coolers is not included in the components WSLR. This piping is shown on flow diagram 124A-1.3 at location K4. Include these components on Table 2.5-9 or provide a justification for their exclusion

Response to RAI 2.5.6-11

Piping and components downstream of the emergency feedwater pump motor air coolers do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). The Low Pressure Service Water System is required to provide cooling water through the coolers, but analysis has shown that the water does not have to be returned. Therefore, the piping and components downstream of the emergency feedwater pump motor air coolers are excluded from the scope of license renewal.

RAI 2.5.6-12 (12/2/98C)
On flow diagram 124B-2.1, at location K14, LPSW system piping from the discharge of the high pressure injection (HPI) pump motor bearing cooling jackets transitions from WSLR to not WSLR. Details of the piping downstream of this transition are available on flow diagram 124B-1.6, which was not included in the application. Please provide a copy of the flow diagram 124B-1.6 with the portion of LPSW system WSLR highlighted, or justify why this portion of the LPSW system is not WSLR.

Response to RAI 2.5.6-12
The license renewal scope as highlighted on Oconee License Renewal Flow Diagram OLRFD-124B-2.1 is correct. The piping and components downstream of the high pressure injection pump motor bearing cooling jackets do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). The Low Pressure Service Water System is required to provide cooling water through the coolers, but analysis has shown that the water does not have to be returned. Therefore, the piping and components downstream of the high pressure injection pump motor bearing cooling jackets are excluded from the scope of license renewal.

RAI 2.5.6-13 (12/2/98C)
Radiation monitor heat exchangers and piping supporting cooling system flow is not included WSLR as indicated on flow diagram 124B-1.5. Please provide a justification why these components and piping are not considered WSLR, or indicate where in the application these components are addressed.

Response to RAI 2.5.6-13
The piping and components downstream of valves LPSW-265, 112, and 74 do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the piping and components are excluded from the scope of license renewal.

Exhibit A, Section 2.5.7, Process Auxiliaries

RAI 2.5.7-2 (11/30/98C)

Flow restriction orifices are installed in several pipes in order to limit the mass flow rate during an accident. Clarify if these orifices are within the scope of license renewal. If so, provide a cross reference to where these items are discussed in the submittal. If not, provide the basis for their exclusion. Additionally, provide a discussion of the intended functions these items might perform for license renewal.

Response to RAI 2.5.7-2

Section 2.5-7 of Exhibit A of the Application includes the Chemical Addition System and the Coolant Storage System. No orifices are within the license renewal portion of the Coolant Storage System. The orifices within the license renewal portions of the Chemical Addition System are within scope and subject to an aging management review. The aging management review for these orifices is presented in Section 3.5-7. The orifices in the Chemical Addition System provide pressure boundary and throttle flow for flow measurement. Flow measurement is not required in support of the system intended functions within the scope of license renewal. Therefore, the only component intended function of the orifices is pressure boundary.

Exhibit A, Section 2.5.8, Air Conditioning, Heating, Cooling and Ventilation Systems

RAI 2.5.8-3 (11/24/98C)
Indicate whether the following are within the scope of license renewal, and if not, provide a justification for their exclusion:

a. Flow Diagram 116G-1.1: Supply and return/exhaust ductwork up to the co-ordinate L-2 (supply) and B-3 (exhaust) are highlighted as within the scope of license renewal, yet the ductwork beyond that is not highlighted.

b. Flow Diagram 116G-1.2: Ductwork for exhaust from the lower levels to the exhaust fan plenum and supply and return/exhaust to and from the ventilation equipment area and janitorial storage areas are not highlighted.

c. Flow Diagram 116G-1.3: Units 1 and 2 battery room exhaust ductworks (for exhaust fan with back draft damper and bird screen Units 1VS AH0031C and 2VSAH0031C) are highlighted within the boundaries identified by dotted red rectangles and inward pointing "LR" scoping arrows. However, the outward pointing "LR" scoping arrows are also shown away from these rectangles without any interface information.

d. Flow Diagram 116G-1.4: Exhaust from the condenser steam air ejectors and the sample hood exhaust to the specific vent stack of Units 1, 2 and 3 are not highlighted. Also, the filter discharges to specific vent stack of Units 1 and 3 are not highlighted.

e. Flow Diagram 116G-2.1: Supply and return/exhaust ductwork up to the co-ordinate L-2 (supply) and C-5 (exhaust) are highlighted as within the scope of license renewal, yet the ductwork beyond that are not highlighted.

f. Flow Diagram 116G-3.1: Return/exhaust ductwork up to the co-ordinate E-4 is highlighted as within the scope of license renewal, yet the exhaust/return ductwork from other areas are not highlighted.

g. Flow Diagram 116G-3.2: The supply air ductwork to serve the lower levels, beyond co-ordinate J-2, is not highlighted. Also, the supply air (from AHU 3-9) and return/exhaust (from served areas by AHU 3-9) ductwork are not highlighted.

Response to RAI 2.5.8-3

a. The highlighted portions of OLRFD-116G-1.1 are required for fire protection as they support a system intended function of smoke removal for the Auxiliary Building. Non-highlighted portions do not support any Auxiliary Building Ventilation System intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the ductwork beyond the supply and return/exhaust ductwork up to the coordinate L-2 (supply) and B-3 (exhaust) is excluded from the scope of license renewal.

b. The ductwork for exhaust from the lower levels to the exhaust fan plenum and supply and return/exhaust to and from the ventilation equipment area and janitorial storage areas shown on OLRFD-116G-1.2 do not support any Auxiliary Building Ventilation System intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the ductwork for exhaust from the lower levels to the exhaust fan plenum and supply and return/exhaust to and from the ventilation equipment area and janitorial storage areas is excluded from the scope of license renewal.

c. The outward pointing "LR" arrows should have been omitted from OLRFD-116G-1.3.

d. The exhaust from the condenser steam air ejectors and the sample hood to the specific vent stack of Units 1, 2 and 3 and the filter discharges to specific vent stacks of Units 1 and 3 shown on OLRFD-116G-1.4 do not support any Auxiliary Building Ventilation System intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, this piping is excluded from the scope of license renewal.

e. The supply and return/exhaust ductwork up to the coordinate L-2 (supply) and C-5 (exhaust) shown on OLRFD-116G-2.1 support the Auxiliary Building Ventilation System intended function of smoke removal for the Auxiliary Building. The ductwork beyond co-ordinate L-2 (supply) and C-5 (exhaust) does not support any system intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, this ductwork is excluded from the scope of license renewal.

f. The return/exhaust ductwork shown on OLRFD-116G-3.1 up to the coordinate E-4 is required for fire protection as it supports an Auxiliary Building Ventilation System intended function of smoke removal for the Auxiliary Building. The return/exhaust ductwork from other areas does not support any system intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the return/exhaust ductwork from other areas is excluded from the scope of license renewal.

g. The supply air ductwork to serve the lower levels beyond coordinate J-2, the supply air from AHU 3-9 and return/exhaust (from served areas by AHU-3-9) ductwork shown on OLRFD-116G-3.2 does not support any Auxiliary Building Ventilation system intended function as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the supply air ductwork to serve the lower levels beyond coordinate J-2, the supply air from AHU 3-9 and return/exhaust (from served areas by AHU-3-9) ductwork is excluded from the scope of license renewal.

Exhibit A, Section 2.5.9, Steam and Power Conversion Systems

RAI 2.5.9-1 (11/24/98D)
Section 2.5.9.1 states that the portions of the main steam system piping within the scope of license renewal are designed and constructed to the requirements of Oconee System Piping Class F and G. However, in reviewing the main steam system piping drawings identified in Table 2.5-14, the staff finds that most of Class G piping are not included in the scope of license renewal.

It is not clear why certain portions of Class G piping are included in the scope and the others are not. Explain the basis for your determination of which portions of Class G piping are within the scope and which portions are not

Response to RAI 2.5.9-1
Oconee Pipe Class G portions of the main steam system that are highlighted (within scope) were included because these portions support Main Steam System intended functions as defined in §54.4(a)(1), (2), (3), or (b). The remaining Oconee Pipe Class G portions of the Main Steam System were determined not to support any Main Steam System intended functions.

RAI 2.5.9-2 (11/24/98D)
In Drawing No. OLRFD-122A-1.1 (Main Steam System) Locations J2, J3, I2, I3, E2, E3, D2, D3, there are a variety of instruments (such as "MS P," "MS CR," "MS RD," "MS SC") which appear to be excluded from the scope of license renewal. For each of the instrument types on this drawing as examples, provide the basis for excluding those instrumentation from the scope of license renewal in accordance with 10 CFR 54.4.

Response to RAI 2.5.9-2
The rules for highlighting the Oconee License Renewal Flow Diagrams as provided in OLRP-1002 states "All instrumentation lines normally open to the process system through, but not including the instrument, are included in License Renewal"

To more correctly reflect the Integrated Plant Assessment that was performed this sentence should read: "Although they are not highlighted, all instrumentation lines off highlighted lines on the OLRFD drawings, through the instrument, are included in the scope of License Renewal".

Instrumentation lines within the scope of license renewal were not highlighted on the OLRFD drawings to reduce "clutter" and improve "readability" of the OLRFD drawings. Instrumentation lines are listed in Tables 2.5-15 and 3.5-7 of Exhibit A of the Application as tubing. Instruments are within the scope of license renewal but are not subject to an aging management review per §54.21(a)(1)(i) and are excluded from Tables 2.5-15 and 3.5-7.

RAI 2.5.9-3 (11/24/98D)

It shows in Drawing No. OLRFD-122A-1.4 (Emergency Feedwater (FDW) Pump Turbine Steam Supply and Exhaust) that the emergency FDW pump turbine is included within the scope of license renewal. Provide the basis for excluding the main FDW pump turbines in Drawing No. OLRFD-122A-1.3 (Main FDW Pump Turbines 1A & 1B) from the scope of license renewal in accordance with 10 CFR 54.4.

Response to RAI 2.5.9-3

The emergency feedwater pump turbine is within the scope of license renewal since it supports an Emergency Feedwater System intended function. The main feedwater pump turbines do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the main feedwater pump turbines are excluded from the scope of license renewal.

RAI 2.5.9-4 (11/24/98D)

In Drawing No. OLRFD-121A-1.7 (Condensate System), it shows that upper surge tanks 1A and 1B are included within the scope of license renewal.

a. Provide the basis for excluding the upper surge tank dome (located between the above two tanks) from the scope of license renewal in accordance with 10 CFR 54.4.

b. Provide the basis for excluding the condensate storage tank from the scope of license renewal in accordance with 10 CFR 54.4.

Response to RAI 2.5.9-4

a. The upper surge tank dome does not support any Condensate System intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore the upper surge tank dome is excluded from the scope of license renewal

b. The condensate storage tank does not support any Condensate System intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, the condensate storage tank is excluded from the scope of license renewal.

RAI 2.5.9-5 (11/24/98D)

In Drawing No. OLRFD-121A-1.4 (Condensate System), it shows that the piping within the scope of the license renewal (highlighted in blue) stops at Locations F3, E9, and F9. Provide the bases for your determination that piping downstream of these locations is not considered within the scope of license renewal.

Response to RAI 2.5.9-5

Piping and components highlighted on this drawing are important in maintaining the hotwell water supply inventory for Emergency Feedwater System supply. (See Note 7 on the OLRFD.) Failure of the piping and components past locations F3, E9, and F9 would not affect hotwell supply inventory since they are at a higher elevation than the required hotwell level. In addition, the piping and components downstream of these locations do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, piping and components after locations F3, E9, and F9 are excluded from the scope of license renewal.

RAI 2.5.9-6 (11/24/98D)

In Drawing No. OLRFD-121A-1.6 (Condensate System), it shows that the piping within the scope of the license renewal (highlighted in blue) stops at Location F5, D5, and B5. Provide the bases for your determination that piping downstream of these locations is not considered within the scope of license renewal.

Response to RAI 2.5.9-6

Piping and components highlighted on this drawing are important in maintaining the hotwell water supply inventory for Emergency Feedwater System supply. (See Note 5 on the OLRFD.) Failure of the piping and components past locations F5, D5, and B5 would not affect hotwell supply inventory since they are at a higher elevation than the required hotwell inventory. In addition, the piping and components downstream of these locations do not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore, piping and components after locations F5, D5, and B5 are excluded from the scope of license renewal.

RAI 2.5.9-7 (11/24/98D)

In Drawing No. OLRFD-121B-1.3 (Feedwater System), provide the bases why the piping considered within the scope of license renewal (highlighted in blue) stops at valve No. 1FW-41 (Location J6) and No.1FW-32 (Location D6). [See also RAI No. 2.5.9-1.]

Response to RAI 2.5.9-7

To answer this RAI, Duke assumes that the staff meant valves 1FDW-41 and 1FDW-32 since valves 1FW-41 and 1FW-32 do not exist on OLRFD-121B-1.3. Piping upstream of valves 1FDW-41 and 1FDW-32 does not support any system intended functions as defined in §54.4(a)(1), (2), (3), or (b). Therefore the piping upstream of valves 1FDW-41 and 1FDW-32 is excluded from the scope of license renewal.

Exhibit A, Section 2.5.10, Post-Accident Hydrogen Control

RAI 2.5.10-1 (12/1/98A)

Flow Diagrams OLRFD-110A-1.3, 2.3 and 3.3 show the hydrogen analyzers to be within the scope of license renewal. The hydrogen analyzers, however, are not included as one of the mechanical components in Table 2.5-17, "Components of Post-Accident Hydrogen Control Systems and Their Intended Functions," of OLRP-1001.

Response to RAI 2.5.10-1

Table 2.5-17 of Exhibit A of the Application lists only those components subject to an aging management review. While the hydrogen analyzers are within the scope of license renewal, they are active components per NEI-95-10 (Revision 0) Industry Guideline for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule, Appendix B, Gas Analyzers/Transmitters and are not subject to an aging management review per §54.21(a)(1)(i). Therefore, the hydrogen analyzers are not listed in Table 2.5-17.

RAI 2.5.10-2 (12/1/98A)

Clarify why Flow Diagram OLRFD-107B-1.1 was excluded from Table 2.5-16, "Flow Diagrams Indicating Evaluation Boundaries of Post-Accident Hydrogen Control Systems," of OLRP-1001. Clarify this inconsistency.

Response to RAI 2.5.10-2

OLRFD-107B-1.1 should be included in the list of diagrams in Table 2.5-16 of Exhibit A of the Application. This omission was simply an oversight.

Exhibit A, Section 2.5.13, Keowee Hydroelectric Station

RAI 2.5.13-1 (11/20/98F)
Section 2.5.13 states that the license renewal flow diagrams listed in Table 2.5-22 show the evaluation boundaries for the portions of the Keowee systems that are within the scope of license renewal. Further, it states that the mechanical components and their intended functions for the systems in this section are identified in Table 2.5-23.

In a conference call on November 3, 1998, Duke Energy stated that the components subject to aging management review (AMR) are listed in Table 2.5-23. In the scoping process, it is important to be able to distinguish between the components that are within the scope of license renewal (in accordance with 10 CFR 54.4) and a subset of components that are subject to AMR (in accordance with 10 CFR 54.21) (i.e., those that are long-lived and perform an intended function without moving parts or change in configuration or properties). However, it is not clear from the statement in Section 2.5.13, describing Table 2.5-23, whether the components listed in Table 2.5-23 are within the scope of license renewal or those specifically subject to AMR. Commensurate with the items discussed in the conference call on November 3, 1998, clarify and confirm that the components listed in Table 2.5-23 are those subject to AMR. This comment also applies to the other sections of Chapter 2 (i.e., clarify that structures and components contained in Chapter 2 tables, consistent with the RAI above regarding Table 2.5-23, are subject to AMR).

Response to RAI 2.5.13-1
The components within the highlighted boundaries of the Oconee License Renewal Flow Diagrams (OLRFDs) and Keowee License Renewal Flow Diagrams (KLRFDs) are the components within the scope of license renewal (in accordance with §54.4). The screening process described in Section 2.5.2 of Exhibit A of the Application was then performed on these components to determine the components subject to aging management review. When this process is applied to the OLRFDs and KLRFDs listed in Table 2.5-22, the resulting components are listed in Table 2.5-23. Thus, the components listed in Table 2.5-23 are the Keowee system components within the scope of license renewal that are subject to aging management review, in accordance with §54.21.

The mechanical components listed in the appropriate tables of Section 2.5 of the Application are those mechanical components within the scope of license renewal and subject to aging management review. Additionally, the structures and structural components listed in Tables 2.7-1 through 2.7-8 are within the scope of license renewal and subject to aging management review.

Exhibit A, Section 3.4.10, Letdown Coolers

RAI 3.4.10-1 (11/18/98B)
It is stated in Section 3.4.10.4 of the license renewal application that during a reactor trip, the increased flow through the letdown cooler caused severe thermal and vibrational stresses on the tubes that eventually caused the tubes to crack. Two of the letdown coolers have been replaced and the other four have been repaired and the operating procedures have been changed. Describe the repairs which were performed on the damaged letdown coolers. Also, describe the specific analyses which were performed to assure that thermal and vibrational stresses during normal and off-normal operation will not cause fatigue failure during the projected period of operation.

Response to RAI 3.4.10-1
Section 3.4.10.4 of Exhibit A of the Application contains operating experience associated with the letdown coolers. The letdown coolers are of the shell and spiral tube design. A review of operational history identified some events where the tubes cracked due to thermal and vibrational stresses caused by improper operation of the coolers. As related to RAIs 3.4.10-1 and 3.4.10-2, improper operation is defined as operation beyond the established design parameters versus normal and off-normal operations that are still within established design parameters.

Of the six coolers, the repairs to the four coolers not replaced consisted of plugging the cracked tube to remove it from service. Operational procedure changes were made to ensure operation within specified design parameters. After adjustments were made to the plant operational procedures, the letdown coolers have not experience any cracking due to thermal or vibrational stresses. This operating experience is significant in that it demonstrates that the tube cracking was operational and not age-related. Because operation within their design parameters precludes damage to the letdown cooler tubing due to thermal or vibrational stresses, no further analyses were necessary to address these issues for license renewal.

Loss of material and cracking (not thermal or vibration induced) are identified in Section 3.4.10.2 as the applicable aging effects for the letdown coolers. From Section 3.4.10.5 of the Application, these aging effects are managed by the Chemistry Control Program and Reactor Coolant System Operational Leakage Monitoring. The Chemistry Control Program and Reactor Coolant System Operational Leakage Monitoring are described in Sections 4.6 and 4.23, respectively, of Exhibit A of the Application.

RAI 3.4.10-2 (11/18/98B)
Describe the specific maintenance and inspection activities which are performed on the letdown coolers to manage fatigue damage due to excessive vibrational stresses which might occur during off-normal operation.

Response to RAI 3.4.10-2
As described in the response to RAI 3.4.10-1, cracking due to thermal and vibrational stresses is not an applicable aging effect for the letdown coolers. Therefore, no specific maintenance and inspection activities to manage this type of cracking are required.

RAI 3.4.10-3 (11/18/98B)
Indicate whether or not the fatigue evaluation of the letdown cooler subcomponents was performed by treating it as a separate mechanism or in combination with other age-related degradation mechanisms such as corrosion and fouling.

Response to RAI 3.4.10-3
As described in the response to RAI 3.4.10-1, no further fatigue analyses were necessary to address letdown cooler tube cracking due to thermal or vibrational stresses caused by improper operation. Therefore, fatigue was not considered as a separate mechanism or in combination with other mechanisms.

RAI 3.4.10-4 (11/18/98B)
Identify any modifications of the letdown coolers or related components which may have an impact on the projected fatigue usage of the subcomponents of the letdown coolers during the extended period of operation.

Response to RAI 3.4.10-4
The letdown coolers are constructed to ASME Section III, Subsection ND, requirements on the tube-side and ASME Section VIII, Division I on the shell side. A fatigue evaluation that would establish a projected fatigue usage factor was not required by the ASME Code for the design of these coolers. Therefore, no modifications of the letdown coolers will have an impact on the projected fatigue usage of the subcomponents of the letdown coolers during the extended period of operation.

Exhibit A, Section 3.5.3, Containment Heat Removal

RAI 3.5.3-1 (11/18/98B)
Identify any portions of the Containment Heat Removal System piping within the scope of license renewal that are not designed to withstand the effects of a design basis earthquake. Clarify the piping segments within the category of "Seismic II over I" (a non-seismic Category I system, structure or component whose failure could cause loss of safety function of a seismic Category I system, structure, or component) that are included within Oconee's current licensing basis and would be subject to aging management review. Additionally, clarify which aging management program will address these structures and components and specifically discuss implementation of the program for these segments of piping systems to manage applicable aging effects during the period of extended operation.

Response to RAI 3.5.3-1
Any portions of the mechanical system piping within the scope of license renewal that are not designed to withstand the effects of a design basis earthquake can be determined from information contained on the Oconee License Renewal Flow Diagrams (OLRFDs) in conjunction with tables in Exhibit A of the Application. Table 2.5-1 of the Application defines Oconee Pipe Classes, the Code Class to which each pipe class is designed, and whether the pipe class is designed for seismic loading. Oconee Pipe Classes A, B, C, D, and F are designed to withstand the effects of a design basis earthquake. Oconee Pipe Classes E, G, and H are not designed to withstand the effects of a design basis earthquake. Piping is defined on the OLRFD drawings using line numbers within rectangular boxes, called "flags." The line number within the flag corresponds to a number in the legend at the bottom of the drawing entitled "Design Parameters." For a given number, the Oconee [Pipe] Class is stated. Any piping labeled with a line number that corresponds to Oconee [Pipe] Class E, G, or H is not designed to withstand the effects of a design basis earthquake.

As described in Section 2.2.1.1(c) of the Application, two types of physical interactions must be considered for the purposes of scoping "Seismic II/I" piping and components. If leakage of fluid from a piping system may cause failure of an essential system, then the pressure boundary and structural integrity of the piping must be maintained. These piping segments are designated as Oconee Pipe Class D. Specific to this RAI, the Containment Heat Removal System at Oconee within the scope of license renewal consists of the Reactor Building Cooling System and the Reactor Building Spray System. No piping segments meeting these criteria are included in the piping within the scope of license renewal in these systems.

The other type of physical interaction relates to those components that must remain in place such that they do not fall onto essential equipment causing it to fail. In this case, only the structural integrity of the components is required. This function is the responsibility of the component support. Section 2.7.2.2.1 of the Application provides an explanation of component supports.

The aging management programs listed throughout Section 3.5 of the Application for a given system, or portion thereof, apply to all applicable portions of the system, regardless of pipe class.

RAI 3.5.3-2 (11/18/98B)
Thermal fatigue has not been identified as an applicable aging effect for the components of the Containment Heat Removal System. Identify the Code Class requirements for which these components were designed. Also, discuss the engineering analysis for this system including the specific design temperatures, operating conditions, and thermal cycles, which were used in the analysis to make the determination that the assumption of less than 7000 cycles is valid for all locations during the extended period of operation.

Response to RAI 3.5.3-2
Thermal fatigue is considered a Time Limited Aging Analysis (TLAA) for the mechanical system components that are designed to applicable Code Classes and are within the scope of license renewal. A description of the process by which the engineering analysis was performed, and as it applies to Containment Heat Removal System, is described in Section 5.5.1 of Exhibit A of the Application. The analysis is contained in an Oconee engineering calculation.

Code Class requirements for components within the Containment Heat Removal System within the scope of license renewal can be determined from information contained on the Oconee License Renewal Flow Diagrams (OLRFDs) in conjunction with tables in the Application. Piping is defined on the OLRFD drawings using line numbers within rectangular boxes, called "flags." The line number within in the flag corresponds to a number in the legend at the bottom of the drawing entitled "Design Parameters." For a given number, the Oconee [Pipe] Class is stated. Table 2.5-1 of the Application then defines Oconee Pipe Classes and states the Code Class to which each pipe class is designed.

Exhibit A, Section 3.5.6, Auxiliary Systems

RAI 3.5.6-1 (11/18/98C)
Based on the staff's experience, degradation of piping systems (e.g., cracking of weld) may potentially be caused by vibration (mechanical or hydrodynamic) loading. Clarify whether this loading effect has been considered in the aging review for the auxiliary systems discussed in Section 3.5.6, and, if this effect is excluded, provide the basis for its exclusion.

Response to RAI 3.5.6-1
Section 3.2 of Exhibit A of the Application describes the process used by Duke to identify the *applicable* aging effects for the structures and components subject to an aging management review. First, a list of *potential* aging effects to consider for Oconee structures and components subject to an aging management review were identified by reviewing available industry literature. In addition, the material and service environment required for the onset and propagation for each potential aging effect were identified. Next, for those structures and components subject to an aging management review, the plant-specific material of construction and service environment were identified. The potential aging effects became applicable aging effects when both the plant-specific material of construction and service environment match the material and service environment necessary for the potential aging effect to occur and the component-aging effect could result in a loss of the component intended function during the period of extended operation if left unmanaged. To provide reasonable assurance that all of the applicable aging effects had been identified for the structures and components subject to an aging management review, NRC generic communications, industry experience, and relevant Oconee experience were reviewed.

Section 3.5.2 presents all the potential aging effects that were considered for applicability to Oconee mechanical system components. One of the potential aging effects considered for Oconee was cracking due to vibration. Cracking due to vibrational (mechanical or hydrodynamic) loads was a potential aging effect that was determined to be not applicable to auxiliary systems components subject to an aging management review. Cracking due to vibration can be attributed to insufficient design. Vibration characteristically leads to cracking in a short period of time, on the order of hours to days of operation. For example, a component with a 1 Hz vibratory load will be subjected to 10^7 cycles in four months of service, so that failure is probable early in life for vibratory stresses above the endurance limit. Because this time period is short when compared to the overall plant operational life, any cracking will be identified and corrected long before the period of extended operation. Therefore, cracking due to vibrational loads, both mechanical and

hydrodynamic, is not an applicable aging effect for the auxiliary systems components subject to an aging management review.

RAI 3.5.6-2 (11/18/98C)
Section 2.5.6 indicates that some portions of the auxiliary systems within the scope of license renewal are not designed to withstand the effects of a design basis earthquake. Clarify which components and piping segments within the category of "Seismic II over I" (a nonseismic Category I system, structure, or component whose failure could cause loss of safety function of a seismic Category I system, structure, or component) would be subject to aging management review. Additionally, clarify which aging management program will address these components and piping segments and specifically discuss implementation of the program to manage the applicable aging effects during the period of extended operation.

Response to RAI 3.5.6-2
As described in Section 2.2.1.1(c) of Exhibit A of the Application, two types of physical interaction must be considered for the purposes of scoping "Seismic II/I" piping and components. If leakage of fluid from a piping system may cause failure of an essential system, then the pressure boundary and structural integrity of the piping must be maintained. These piping segments are designated as Oconee Pipe Class D. Portions of piping in the Condenser Circulating Water System on OLRFD-133A-1.1, 2.1, and 3.1 and OLRFD-121C-1.1, 2.1, and 3.1 are Class D. Also, portions of piping in the Low Pressure Service Water System on OLRFD-124B-1.3, 2.3, and 3.3 are Class D.

The other type of physical interaction relates to those components that must remain in place such that they do not fall onto essential equipment causing it to fail. In this case, only the structural integrity of the components is required. This function is the responsibility of the component support. Section 2.7.2.2.1 of Exhibit A of the Application provides an explanation of component supports.

The aging management programs listed throughout Section 3.5 of the Application for a given system, or portion thereof, apply to all applicable portions of the system, regardless of pipe class.

Exhibit A, Section 3.5.7, Process Auxiliaries

RAI 3.5.7-1 (11/18/98C)
Based on the staff's experience, degradation of piping systems (e.g., cracking of weld) may potentially be caused by vibration (mechanical or hydrodynamic) loading. Clarify whether this loading effect has been considered in the aging review for the process auxiliaries discussed in Section 3.5.7, and, if this effect is excluded, provide the basis for its exclusion.

Response to RAI 3.5.7-1
Section 3.2 of Exhibit A of the Application describes the process used by Duke to identify the *applicable* aging effects for the structures and components subject to an aging management review. First, a list of *potential* aging effects to consider for Oconee structures and components subject to an aging management review were identified by reviewing available industry literature. In addition, the material and service environment required for the onset and propagation for each potential aging effect were identified. Next, for those structures and components subject to an aging management review, the plant-specific material of construction and service environment were identified. The potential aging effects became applicable aging effects when both the plant-specific material of construction and service environment match the material and service environment necessary for the potential aging effect to occur and the component-aging effect could result in a loss of the component intended function during the period of extended operation if left unmanaged. To provide reasonable assurance that all of the applicable aging effects had been identified for the structures and components subject to an aging management review, NRC generic communications, industry experience, and relevant Oconee experience were reviewed.

Section 3.5.2 presents all the potential aging effects that were considered for applicability to Oconee mechanical system components. One of the potential aging effects considered for Oconee was cracking due to vibration. Cracking due to vibrational (mechanical or hydrodynamic) loads was a potential aging effect that was determined to be not applicable to process auxiliaries components subject to an aging management review. Cracking due to vibration can be attributed to insufficient design. Vibration characteristically leads to cracking in a short period of time, on the order of hours to days of operation. For example, a component with a 1 Hz vibratory load will be subjected to 10^7 cycles in four months of service, so that failure is probable early in life for vibratory stresses above the endurance limit. Because this time period is short when compared to the overall plant operational life, any cracking will be identified and corrected long before the period of extended operation. Therefore, cracking due to vibrational loads, both mechanical and hydrodynamic, is not an applicable aging effect for the auxiliary systems components subject to an aging management review.

RAI 3.5.7-2 (11/18/98C)
Section 2.5.7 indicates that some portions of the process auxiliaries within the scope of license renewal are not designed to withstand the effects of a design basis earthquake. Clarify which components and piping segments within the category of "Seismic II over I" (a nonseismic Category I system, structure, or component whose failure could cause loss of safety function of a seismic Category I system, structure, or component) would be subject to aging management review. Additionally, clarify which aging management program will address these components and piping segments and specifically discuss implementation of the program to manage the applicable aging effects during the period of extended operation.

Response to RAI 3.5.7-2
As described in Section 2.2.1.1(c) of Exhibit A of the Application, two types of physical interaction must be considered for the purposes of scoping "Seismic II/I" piping and components. If leakage of fluid from a piping system may cause failure of an essential system, then the pressure boundary and structural integrity of the piping must be maintained. These piping segments are designated as Oconee Pipe Class D. No portions of the process auxiliaries piping within the scope of license renewal are designated as Oconee Pipe Class D.

The other type of physical interaction relates to those components that must remain in place such that they do not fall onto essential equipment causing it to fail. In this case, only the structural integrity of the components is required. This function is the responsibility of the component support. Section 2.7.2.2.1 of the Application provides explanation of component supports.

The aging management programs listed throughout Section 3.5 of the Application for a given system, or portion thereof, apply to all applicable portions of the system, regardless of pipe class.

Exhibit A, Section 3.5.8, Air Conditioning, Heating, Cooling and Ventilation Systems

RAI 3.5.8-1 (11/20/98B)
Section 3.5.8 of OLRP-1001 includes a statement that the heating ventilation and air conditioning (HVAC) systems are those systems designed to maintain the ambient air conditions within the auxiliary building and include the auxiliary building ventilation (ABV) system, control room pressurization and filtration (CRPF) system, and penetration room ventilation (PRV) system. Are there safety-related HVAC systems other than these three systems located in other buildings (such as reactor building) that need to be considered in the aging management review? If yes, provide a basis not to include them in the aging management review.

Response to RAI 3.5.8-1
Three other safety-related ventilation systems, in addition to those systems in Section 3.5.8 of Exhibit A of the Application, are within the scope of license renewal. The other ventilation systems are the Reactor Building Cooling System, Reactor Building Purge System, and the Standby Shutdown Facility (SSF) HVAC System. The component screening results for Reactor Building Cooling System, Reactor Building Purge System, and the SSF HVAC System are found in Sections 2.5.3, 2.5.4, and 2.5.14, respectively. The aging management review for each system is found in Sections 3.5.3, 3.5.4, and 3.5.14 of Exhibit A of the Application.

RAI 3.5.8-2 (11/20/98B)
For the ABV, CRPF and PRV systems, Subsections 3.5.8.1.1, 3.5.8.2.1 and 3.5.8.3.1 state that these system components are exposed externally to the ambient conditions within the auxiliary building. Internally, these system components are exposed to a ventilation air environment. In Subsections 3.5.8.1.2, 3.5.8.2.2, and 3.5.8.3.2, the OLRP states that these three systems contain ductwork and other components constructed of aluminum, galvanized steel and stainless steel. No applicable aging effects have been identified for the components constructed from these materials in a ventilation air environment. Based on the bases stated above, Duke concludes in Subsections 3.5.8.1.3, 3.5.8.2.3 and 3.5.8.3.3 that because no applicable aging effects have been identified for the components of the ABV, CRPF and PRV systems within the scope of license renewal, no aging management program is required for these three systems during the period of extended operation. Provide a basis and justification to demonstrate that the conclusion that no aging management program is required for these three systems during the period of extended operation is also applicable for the portion of these systems exposed to the ambient conditions.

Response to RAI 3.5.8-2
The aging management review presented in Sections 3.5.8.1, 3.5.8.2 and 3.5.8.3 of Exhibit A of the Application is only for the internal surfaces of the Auxiliary Building Ventilation System, Control Room Pressurization and Filtration System, and Penetration Room Ventilation System, respectively. The aging management review for the external surfaces for these three systems, which are exposed to ambient conditions, is presented in Section 3.5.2.7.2. From Section 3.5.2.7.2, loss of material is the applicable aging effect for the external surfaces of these three systems that is managed by one or both of the following programs: Boric Acid Wastage Surveillance Program and Inspection Program for Civil Engineering Structures and Components. The Boric Acid Wastage Program is described in Section 4.5 and the Inspection Program for Civil Engineering Structures and Components is presented in Section 4.19 of Exhibit A of the Application.

RAI 3.5.8-3 (11/20/98B)
According to the staff's past review experience of other nuclear power plants, cracking of ductworks due to vibration-induced fatigue and loosening fasteners due to dynamic loading are very common types of aging effects identified in HVAC systems, especially in the vicinity of attached device types exposed to dynamic loads such as fans. Provide a justification of why these types of aging effects are not applicable for the HVAC systems at Oconee.

Response to RAI 3.5.8-3
Cracking of ductwork due to vibrational loads and self-loosening of fasteners due to dynamic loading were determined to be not applicable to Oconee ventilation components subject to an aging management review. Cracking due to vibration and self-loosening of fasteners due to dynamic loading are precluded by system design. In the Oconee HVAC systems falling within the scope of license renewal, components whose operation would impart vibration and dynamic loading to other system components are equipped with isolators to prevent transmission of vibration and dynamic loading to the rest of the system. Therefore, cracking of ductwork due to vibrational loads and self-loosening of fasteners due to dynamic loading are not applicable aging effects for the Oconee ventilation components subject to an aging management review.

RAI 3.5.8-4 (11/20/98B)
Provide a basis of why the attached devices (or device types) such as filters, hand valves (bodies), temperature transmitter (if performing a function subject to license renewal requirements), and heat exchangers, etc. are not considered in the aging management review.

Response to RAI 3.5.8-4

The systems in Section 3.5-8 of Exhibit A of the Application include the Auxiliary Building Ventilation System, the Control Room Pressurization and Filtration System, and the Penetration Room Ventilation System.

The Oconee License Renewal Flow Diagrams (OLRFDs) that depict the Auxiliary Building Ventilation System, as listed in Table 2.5-12 of the Application, show that there are filters within the license renewal evaluation boundaries. Likewise, these filters are listed in Table 3.5-6 as subject to aging management review. The OLRFDs also show that there are no hand valves within the license renewal evaluation boundaries for this system. Therefore, they are not listed in Table 3.5-6 as subject to aging management review. Transmitters are identified in §54.21(a)(1)(i) as being excluded from an aging management review. This indicates, and Duke Power agrees, that transmitters do not perform their function without moving parts or without a change in configuration or properties. Therefore, transmitters are not subject to an aging management review. The heat exchangers shown on the OLRFDs as within the evaluation boundaries are cooling coils within the air handling units. The cooling function provided by these coils is not required to meet the Auxiliary Building Ventilation System intended functions. From a pressure boundary standpoint, the cooling coils are considered a subcomponent of the air handling units. The air handling units are listed in Table 3.5-6 as subject to aging management review.

The OLRFDs that depict the Control Room Pressurization and Filtration System, as listed in Table 2.5-12 of the Application, show that there are filters within the license renewal evaluation boundaries. Likewise, these filters are listed in Table 3.5-6 as subject to aging management review. The OLRFDs also show that there are no hand valves within the license renewal evaluation boundaries for this system. Therefore, they are not listed in Table 3.5-6 as subject to aging management review. Transmitters are identified in §54.21(a)(1)(i) as being excluded from an aging management review. This indicates, and Duke Power agrees, that transmitters do not perform their function without moving parts or without a change in configuration or properties. Therefore, transmitters are not subject to an aging management review. The heat exchangers shown on the OLRFDs as within the evaluation boundaries are cooling coils within the air handling units. The cooling function provided by these coils is not required to meet the Control Room Pressurization and Filtration System intended functions. From a pressure boundary standpoint, the cooling coils are considered subcomponents of the air handling units. The air handling units are listed in Table 3.5-6 as subject to aging management review.

The OLRFDs that depict the Penetration Room Ventilation System, as listed in Table 2.5-12 of the Application, show that there are filters within the license renewal evaluation boundaries. Likewise, these filters are listed in Table 3.5-6 as subject to aging management review. The OLRFDs also show that there are hand valves within the license renewal evaluation boundaries for this system. Therefore, these valves are also listed in Table 3.5-6 as subject to aging management review. Transmitters are identified in §54.21(a)(1)(i) as being excluded from an aging management review. This indicates, and Duke Power agrees, that transmitters do not perform their function without moving parts or without a change in configuration or properties. Therefore, transmitters are not subject to an aging management review. The OLRFDs show that there are no cooling coils within the license renewal evaluation boundaries for this system. Therefore, they are not listed in Table 3.5-6 as subject to aging management review.

RAI 3.5.8-5 (11/20/98B)
Provide a justification of why loss of material due to mechanical wear of the ductwork systems is not considered a potential aging effect at Oconee.

Response to RAI 3.5.8-5
Section 3.2 of Exhibit A of the Application describes the process used by Duke to identify the *applicable* aging effects for the structures and components subject to an aging management review. First, a list of *potential* aging effects to consider for Oconee structures and components subject to an aging management review were identified by reviewing available industry literature. In addition, the material and service environment required for the onset and propagation for each potential aging effect were identified. Next, for those structures and components subject to an aging management review, the plant-specific material of construction and service environment were identified. The potential aging effects became applicable aging effects when both the plant-specific material of construction and service environment match the material and service environment necessary for the potential aging effect to occur and the component-aging effect could result in a loss of the component intended function during the period of extended operation if left unmanaged. To provide reasonable assurance that all of the applicable aging effects had been identified for the structures and components subject to an aging management review, NRC generic communications, industry experience, and relevant Oconee experience were reviewed.

Wear is considered a potential aging effect for the ductwork as identified in Section 3.5.2 of the Application. Wear is a concern in those locations that experience relative motion. The ductwork in the Auxiliary Building Ventilation System, Control Room Pressurization and Filtration System and the Penetration Room Ventilation System do not experience

relative motion. Therefore, wear is not an applicable aging effect for these ventilation systems.

RAI 3.5.8-6 (11/20/98B)
It is the staff's understanding that the intended function for HVAC duct systems and attached devices (such as fan casings, filters, valves (bodies), and heat exchangers, etc.) is "pressure retaining" (passive intended function). However, no description of how to maintain this passive intended function is discussed in the application. Provide an explanation, of how this passive intended function will be maintained.

Response to RAI 3.5.8-6
Programmatic maintenance of a component intended function is described in Exhibit A of the Application only when a component-applicable aging effect combination is identified that could result in a loss of such function, if left unmanaged. No applicable aging effects were identified for the internal surfaces that, if left unmanaged, would result in a loss of the "pressure retaining" function of the components in the Auxiliary Building Ventilation, Control Room Pressurization and Filtration System, and Penetration Room Ventilation System. As a result, no description of how to maintain this "pressure retaining" function is needed since no applicable aging effects were identified for the extended period of operation.

The aging management of the external surfaces of these systems is located in Section 3.5.2.7.2 of Exhibit A of the Application. From Section 3.5.2.7.2, loss of material due to general corrosion, galvanic corrosion and boric acid wastage is the applicable aging effect for the external surfaces. Loss of material due to general and galvanic corrosion is managed by the Inspection Program for Civil Engineering Structures and Components described in Section 4.19. The Boric Acid Wastage Surveillance Program described in Section 4.5 manages loss of material due to boric acid wastage.

Exhibit A, Section 3.5.13, Keowee Hydroelectric Station

RAI 3.5.13-1 (11/18/98C)

Based on the staff's experience, degradation of piping systems (e.g., cracking of weld) may potentially be caused by vibration (mechanical or hydrodynamic) loading. Clarify whether this loading effect has been considered in the aging review for the Keowee Hydroelectric Station discussed in Section 3.5.13, and, if this effect is excluded, provide the basis for its exclusion.

Response to RAI 3.5.13-1

Section 3.2 of Exhibit A of the Application describes the process used by Duke to identify the *applicable* aging effects for the structures and components subject to an aging management review. First, a list of *potential* aging effects to consider for Oconee structures and components subject to an aging management review were identified by reviewing available industry literature. In addition, the material and service environment required for the onset and propagation for each potential aging effect were identified. Next, for those structures and components subject to an aging management review, the plant-specific material of construction and service environment were identified. The potential aging effects became applicable aging effects when both the plant-specific material of construction and service environment match the material and service environment necessary for the potential aging effect to occur and the component-aging effect could result in a loss of the component intended function during the period of extended operation if left unmanaged. To provide reasonable assurance that all of the applicable aging effects had been identified for the structures and components subject to an aging management review, NRC generic communications, industry experience, and relevant Oconee experience were reviewed.

Section 3.5.2 presents all the potential aging effects that were considered for applicability to Oconee mechanical system components. One of the potential aging effects considered for Oconee was cracking due to vibration. Cracking due to vibrational (mechanical or hydrodynamic) loads was a potential aging effect that was determined to be not applicable to Keowee mechanical system components subject to an aging management review. Cracking due to vibration can be attributed to insufficient design. Vibration characteristically leads to cracking in a short period of time, on the order of hours to days of operation. For example, a component with a 1 Hz vibratory load will be subjected to 10^7 cycles in four months of service, so that failure is probable early in life for vibratory stresses above the endurance limit. Because this time period is short when compared to the overall plant operational life, any cracking will be identified and corrected long before the period of extended operation. Therefore, cracking due to vibrational loads, both mechanical and hydrodynamic, is not an applicable aging effect for the auxiliary systems components subject to an aging management review.

RAI 3.5.13-2 (11/18/98C)
Section 2.5.13 indicates that some portions of the Keowee Hydroelectric Station piping systems within the scope of license renewal are not designed to withstand the effects of a design basis earthquake. Clarify which components and piping segments within the category of "Seismic II over I" (a nonseismic Category I system, structure, or component whose failure could cause loss of safety function of a seismic Category I system, structure, or component) would be subject to aging management review. Additionally, clarify which aging management program will address these components and piping segments and specifically discuss implementation of the program to manage the applicable aging effects during the period of extended operation.

Response to RAI 3.5.13-2
As described in Section 2.2.1.1(c) of Exhibit A of the Application, two types of physical interaction must be considered for the purposes of scoping "Seismic II/I" piping and components. If leakage of fluid from a piping system may cause failure of an essential system, then the pressure boundary and structural integrity of the piping must be maintained. These piping segments are designated as Oconee Pipe Class D. Portions of the Keowee Hydroelectric Station piping within the scope of license renewal are designated as Oconee Pipe Class D. Piping in the Depressing Air System (KLRFD-111A-1.1) and High Pressure Oil System (KLRFD-103A-1.1 and 2.1) are designated as Class D.

The other type of physical interaction relates to those components that must remain in place such that they do not fall onto essential equipment causing it to fail. In this case, only the structural integrity of the components is required. This function is the responsibility of the component support. Section 2.7.2.2.1 of the Application provides explanation of component supports.

The aging management programs listed throughout Section 3.5 of the Application for a given system, or portion thereof, apply to all applicable portions of the system, regardless of pipe class.

Exhibit A, Section 3.5.14, Standby Shutdown Facility Mechanical Components

RAI 3.5.14-1 (11/18/98B)
It is stated in Section 3.5.14.1.1 of the license renewal application that no aging effects have been identified for this system. The diesel exhaust system is exposed to an exhaust gas environment. At some facilities, the structures at the exit of the diesel exhaust system have degraded over a period of time due to impingement of the hot corrosive exhaust gases. The debris from these degraded structures has the potential of blocking the exhaust system and rendering the diesel inoperable during an emergency. Discuss the potential for similar degradation at the Oconee Nuclear Station during the extended period of operation.

Response to RAI 3.5.14-1
The Oconee Standby Shutdown Facility diesel exhaust system does have such a structure at the exit of the diesel exhaust. The diesel serves an emergency backup role and is normally in standby. Required periodic testing of the diesel engines results in approximately ten hours of operation per year. Due to the infrequent operation of the diesel engine, degradation of the structures at the exit of the diesel exhaust system from the impingement of hot corrosive exhaust gases is not considered an applicable aging effect at Oconee.

RAI 3.5.14-2 (11/18/98B)
It is stated in Section 2.5.14.5 of the license renewal Application that the reactor coolant makeup system piping is designated as Oconee Class B and that it is designed to USAS B31.7, Class II requirements. Discuss the engineering analysis for this system including the specific design temperatures, operating conditions, and thermal cycles, which were used in the analysis to make the determination that assumptions of less than 7000 cycles are valid for all locations during the extended period of operation.

Response to RAI 3.5.14-2
Thermal fatigue is considered a Time Limited Aging Analysis (TLAA) for the mechanical system components that are designed to applicable Code Classes and are within the scope of license renewal. A description of the process by which the engineering analysis was performed, and as it applies to Reactor Coolant Makeup System, is described in Section 5.5.1 of Exhibit A of the Application. The analysis is contained in an Oconee engineering calculation.

RAI 3.5.14-3 (11/18/98B)
It is stated in Section 2.4.14.8 of the license renewal application that no applicable aging effects have been identified for the components of the starting air system. The diesel generator starting air system at several other facilities has experienced degradation due to excessive vibration in the piping and starting air valves which in some cases rendered the air receivers incapable of delivering starting air to the diesel engines at the design pressures. Discuss the upgrades, if any, and/or surveillance requirements for the starting air system at Oconee to assure operability of this system during the extended period of operation beyond 40 years.

Response to RAI 3.5.14-3
Section 2.4.14.8 does not exist in the Application. For the response to this RAI, Duke assumes that the Staff is referring to Section 3.5.14.8. Section 3.2 of Exhibit A of the Application describes the process used by Duke to identify the *applicable* aging effects for the structures and components subject to an aging management review. First, a list of *potential* aging effects to consider for Oconee structures and components subject to an aging management review were identified by reviewing available industry literature. In addition, the material and service environment required for the onset and propagation for each potential aging effect were identified. Next, for those structures and components subject to an aging management review, the plant-specific material of construction and service environment were identified. The potential aging effects become applicable aging effects when both the plant-specific material of construction and service environment match the material and service environment necessary for the potential aging effect to occur and the component-aging could result in a loss of the component intended function during the extended period of operation if left unmanaged. To provide reasonable assurance that all of the applicable aging effects had been identified for the structures and components subject to an aging management review, NRC generic communications, industry experience, and relevant Oconee experience were reviewed.

Section 3.5.2 presents all the potential aging effects that were considered for applicability to Oconee mechanical system components. One of the potential aging effects considered was cracking due to vibration. Cracking due to vibrational (mechanical or hydrodynamic) loads was a potential aging effect that was determined to be not applicable to the Starting Air System components subject to an aging management review. Cracking due to vibration can be attributed to insufficient design. Vibration characteristically leads to cracking in a short period of time, on the order of hours to days of operation. For example, a component with a 1 Hz vibratory load will be subjected to 10^7 cycles in four months of service, so that failure is probable early in life for vibratory stresses above the endurance limit. Because this time period is short when compared to the overall plant operational life, any cracking will be identified and corrected long before the period of

extended operation. Therefore, cracking due to vibrational loads, both mechanical and hydrodynamic, is not an applicable aging effect for the Starting Air System components subject to an aging management review.

RAI 3.5.14-4 (11/18/98B)
Section 2.5.14 of the license renewal Application indicates that some portions of the Standby Shutdown Facility piping within the scope of license renewal are not designed to withstand the effects of a design basis earthquake. Clarify the piping segments within the category of "Seismic II over I" (a non-seismic Category I system, structure or component whose failure could cause loss of safety function of a seismic Category I system, structure, or component) that are included within Oconee's current licensing basis and would be subject to aging management review. Additionally, clarify which aging management program will address these structures and components and specifically discuss implementation of the program for these segments of piping systems to manage the applicable aging effects during the period of extended operation.

Response to RAI 3.5.14-4
As described in Section 2.2.1.1(c) of Exhibit A of the Application, two types of physical interaction must be considered for the purposes of scoping "Seismic II/I" piping and components. If leakage of fluid from a piping system may cause failure of an essential system, then the pressure boundary and structural integrity of the piping must be maintained. These piping segments are designated as Oconee Pipe Class D. Portions of piping within the scope of license renewal in the Drinking Water System and Sanitary Lift System on OLRFD-126B-1.1 are Class D. Additionally, some Class D piping exists in the SSF Sump area of the Standby Shutdown Facility Auxiliary Service Water System on OLRFD-133A-2.5. This piping is within the scope of license renewal and is subject to aging management review. Highlighting on OLRFD-133A-2.5 did not, but should have included this section of piping. The aging management review of the SSF Auxiliary Service Water System is found in Section 3.5.14.7 of the Application.

The other type of physical interaction relates to those components that must remain in place such that they do not fall onto essential equipment causing it to fail. In this case, only the structural integrity of the components is required. This function is the responsibility of the component support. Section 2.7.2.2.1 of the Application provides explanation of component supports.

The aging management programs listed throughout Section 3.5 of the Application for a given system, or portion thereof, apply to all applicable portions of the system, regardless of pipe class.

Exhibit A, Section 4.21, Piping Erosion/Corrosion Program

RAI 4.21-6 (11/18/98D)
Section 4.21 of the application describes the piping erosion/corrosion program and indicates that corrective actions are taken prior to the piping reaching the "allowable minimum wall thickness." Please discuss whether piping with a pipe wall thinned locally to this minimum thickness could withstand all licensing basis loads, including bending. Also discuss the evaluation for fittings, such as elbows, tees, reducers, and fabricated branch connections.

Response to RAI 4.21-6
The Piping Erosion/Corrosion Program is credited as an aging management program for a limited portion of the Main Steam and Feedwater Systems within the scope of license renewal. For these locations, inspection results (including pipe and components such as tees and elbows) of the Piping Erosion/Corrosion Program are reviewed to ensure that, considering ongoing wear, the piping remains acceptable by meeting the code requirements for minimum wall thickness. Code requirements for stresses (bending and/or torsional) in the pipe due to other loadings and pressure design (hoop stress) are included in the review. These other loadings are defined by the Oconee design and include, but are not limited to, stresses due to the dead weight of the piping system, thermal expansion, earthquake loadings, and dynamic fluid transients.