September 30, 1999

INTRODUCTION

Pursuant to the requirements of §54.21(b), Duke Energy (Duke) is required to identify any changes to the current licensing basis of Oconee that materially affect the contents of the Application. The content of the Application consists of the original Application submitted by letter dated July 6, 1998, responses to staff questions submitted on the docket under oath, and responses to safety evaluation report open items and confirmatory items, which will be submitted on or about October 15, 1999.

Duke has performed a comprehensive review of many plant documents to identify the changes to the current licensing basis of Oconee that materially affect the contents of the Application. This review has identified the following current licensing basis changes that materially affect the contents of the Application:

1. Plant modification to add the Essential Siphon Vacuum System, the Siphon Seal Water System, the Essential Siphon Vacuum Trenches and the Essential Siphon Vacuum Building
2. Revised Steam Generator Tube Rupture Accident Analysis
3. Functional Change of the Reactor Building Auxiliary Coolers

Each of these changes to the Oconee current licensing basis is described in the following sections.

1. Plant Modification to add Essential Siphon Vacuum System, Siphon Seal Water System, Essential Siphon Vacuum Trenches, and Essential Siphon Vacuum Building

Oconee Nuclear Station has been modified by the addition of the Essential Siphon Vacuum System, Siphon Seal Water System, Essential Siphon Vacuum Trenches and Essential Siphon Vacuum Building. This modification was completed after the Application submittal of in July 1998. The plant modification to add Essential Siphon Vacuum System, Siphon Seal Water System, Essential Siphon Vacuum Trenches and Essential Siphon Vacuum Building is a change to the Oconee current licensing basis.

The Essential Siphon Vacuum System removes trapped air and other gases from the Condenser Circulating Water intake headers thus assuring a source of water to the Low Pressure Service Water System. The Essential Siphon Vacuum System operates during normal operation and any event involving loss of offsite power. The Siphon Seal Water System provides operating liquid to the Essential Siphon Vacuum System pumps and provides sealing and cooling water for the Condenser Circulating Water pump shaft seal and pump motor cooler. Both of these systems are described in Section 9.2.2.2.5 of the Oconee UFSAR.

The Essential Siphon Vacuum Trenches are provided to allow underground routing of cables and piping. The Essential Siphon Vacuum Building encloses portions of the Essential Siphon Vacuum System and the Siphon Seal Water System. The Essential Siphon Vacuum Trenches and the Essential Siphon Vacuum Building are described in Section 3.8.5.1 of the Oconee UFSAR.

The addition of the Essential Siphon Vacuum System, Siphon Seal Water System, Essential Siphon Vacuum Trenches and Essential Siphon Vacuum Building to Oconee increases the number of systems and structures within the scope of license renewal. This plant modification constitutes a material change to the contents of the Application that was submitted July 6, 1998.

The modification to add the Essential Siphon Vacuum System, Siphon Seal Water System, and Essential Siphon Vacuum Building includes the addition of several electrical components, such as, but not limited to, cables, pump motors and valve operators. These electrical components are within the bounds of the electrical integrated plant assessment contained in the Application.

The integrated plant assessment of the Essential Siphon Vacuum System and Siphon Seal Water System are provided in Section 1.1 that follows. The integrated plant assessment of the Essential Siphon Vacuum Trenches and the Essential Siphon Vacuum Building is provided in Section 1.2.

1.1 Mechanical Integrated Plant Assessment

1.1.1 Mechanical Components Subject to Aging Management Review

The portions of the Essential Siphon Vacuum System falling within the scope of license renewal are Oconee System Piping Class F. Class F components are designed to withstand the effects of an earthquake without a loss of function. The material of construction for the components in this system is stainless steel with glass installed in a level glass. The Essential Siphon Vacuum System mechanical components that are subject to aging management review are listed in Table 1-1.

The portions of the Siphon Seal Water System falling within the scope of license renewal are also Oconee System Piping Class F. Class F components are designed to withstand the effects of an earthquake without a loss of function. The material of construction for the components in this system is stainless steel. The Siphon Seal Water System mechanical components that are subject to aging management review are listed in Table 1-2.

1.1.2 Aging Management Review

1.1.2.1 ENVIRONMENTS

The internal surfaces of the components in the Essential Siphon Vacuum System are exposed to air and intermittently to raw water caused by system operation. The applicable aging effects for materials exposed to these environments are discussed in Sections 3.5.2.1 and 3.5.2.4 of Exhibit A of the Application, respectively. The exterior surfaces of the components in the Essential Siphon Vacuum System are exposed to a sheltered environment (Essential Siphon Vacuum Building), yard environment (Essential Siphon Vacuum Trenches), and underground environment. The applicable aging effects for materials exposed to these environments are discussed in Sections 3.5.2.7.2, 3.5.2.7.3 and 3.5.2.7.4 of the Application, respectively.

The internal surfaces of the components in the Siphon Seal Water System are exposed to raw water. The applicable aging effects for stainless steel materials exposed to a raw water environment are discussed in Section 3.5.2.4 of the Application. The exterior surfaces of Siphon Seal Water System are exposed to a sheltered environment (Essential Siphon Vacuum Building, Turbine Building, and Intake Structure), yard environment (Essential Siphon Vacuum Trenches) and underground environment. The applicable aging effects for materials exposed to these environments are discussed in Sections 3.5.2.7.2, 3.5.2.7.3 and 3.5.2.7.4 of the Application, respectively.

1.1.2.2 APPLICABLE AGING EFFECTS

The Essential Siphon Vacuum System and the Siphon Seal Water System contain components constructed of stainless steel. The only additional material of construction is glass in the Essential Siphon Vacuum System which is discussed below. The applicable aging effects for the

stainless steel components exposed to raw water is loss of material due to pitting corrosion and microbiologically influenced corrosion. The staff review of the aging effects of materials exposed to a raw water environment is provided in Section 3.1.3.1.4 of the Safety Evaluation Report (June 1999). Based on its review, the staff concluded that the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

The Essential Siphon Vacuum System stainless steel components are also exposed to air. The applicable aging effect for stainless steel exposed to air with intermittent exposure to raw water is loss of material due to pitting corrosion. Similarly, the staff review of the aging effects of materials exposed to an air/gas environment is provided in Section 3.1.3.1.1 of the Safety Evaluation Report. Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Open Item 3.1.1-1, the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

Fouling is not a concern in the Essential Siphon Vacuum System since the system is primarily an air system, and any raw water intrusion is insufficient to allow for fouling. Fouling due to macro-organisms and silting of the smaller diameter piping in the Siphon Seal Water System is an applicable aging effect. The staff review of the fouling for similar raw water piping is discussed with the System Performance Test Activities in Section 3.6.1.3.2 of the Safety Evaluation Report.

The review to identify applicable aging effects for glass in raw water and air has not been previously reviewed by the staff. Duke has performed a review to identify the aging effects for glass using the methodology described in Section 3.5.2 of Exhibit A of the Application. Based on this review, Duke has determined that there are no applicable aging effects for glass exposed to either raw water or air/gas.

The exterior surfaces of the Essential Siphon Vacuum System and the Siphon Seal Water System components constructed of stainless steel are exposed to a sheltered environment, yard environment and underground environment. No applicable aging effects exist for the stainless steel components exposed to a sheltered environment. The staff review of the aging effects of materials exposed to a sheltered environment is provided in Section 3.1.3.1.7.2 of the Safety Evaluation Report. Based on its review, the staff concluded that the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

Similarly, no applicable aging effects exist for the stainless steel components exposed to a yard environment. The staff review of the aging effects of materials exposed to a yard environment is provided in Section 3.1.3.1.7.3 of the Safety Evaluation Report. Based on its review, the staff

concluded that the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

Finally, for the stainless steel components exposed to an underground environment, loss of material due to pitting corrosion, microbiologically influenced corrosion, and galvanic corrosion, as well as cracking due to stress corrosion are applicable aging effects if the material is in contact with soil or groundwater. The staff review of the aging effects of materials exposed to an underground environment is provided in Section 3.1.3.1.7.4 of the Safety Evaluation Report. Based on its review, the staff concluded that the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

1.1.2.3 AGING MANAGEMENT PROGRAMS

The applicable aging effects must be adequately managed so that the component intended functions will be maintained consistent with the current licensing basis for the period of extended operation. The applicable aging effects for the stainless steel Essential Siphon Vacuum System and Siphon Seal Water System components will be managed by monitoring and controlling the aging effects directly or the relevant conditions that contribute to the onset and propagation of a specific aging effect.

The loss of material due to pitting corrosion and microbiologically influenced corrosion of the stainless steel components exposed to a raw water environment and loss of material due to pitting corrosion of the stainless steel components exposed to an air environment with intermittent exposure to raw water will be managed by the following program as described in Section 4.25 of Exhibit A of the Application and subsequently modified by the collective Duke response to Safety Evaluation Report (June 1999) Open Items 3.2.13-1, 3.2.13-2, 3.2.13-3 and 3.2.13-4:

- Service Water Piping Corrosion Program (as modified)

The staff review of the Service Water Piping Corrosion Program is provided in Section 3.2.13 of the Safety Evaluation Report. Based on its review, the staff concluded that, pending acceptable resolution of the Open Items identified, the applicant has demonstrated that the Service Water Piping Corrosion Program will adequately manage the aging effects associated with a loss of material from corrosion for those systems that have components exposed to a raw water environment for the period of extended operation.

Fouling of the smaller diameter piping in the Siphon Seal Water System will be managed by the following program described in Section 4.27 of Exhibit A of the Application:

- System Performance Testing Activity

This activity for the Siphon Seal Water System is identical to the System Performance Testing Activity described in Section 4.27 of the Application. The staff review of the fouling for similar

raw water piping is discussed with the System Performance Testing Activities in Section 3.6.1.3.2 of the Safety Evaluation Report. Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Confirmatory Item 3.6.1.3.2-1, the applicant has demonstrated that this type of testing activity will adequately manage fouling in similar components of the Auxiliary Service Water System and the Low Pressure Service Water System.

For the stainless steel piping in the Essential Siphon Vacuum System and Siphon Seal Water System that are underground, loss of material and cracking will be managed by the following program described in our Response to RAI 4.3.8-1 (dated December 14, 1998):

- Preventive Maintenance Activities — Condenser Circulating Water System Internal Coatings Inspection and the Standby Shutdown Facility Diesel Fuel Oil Tank Inspection

Specifically, the preventive maintenance activities associated with the Condenser Circulating Water System Internal Coatings Inspection and the Standby Shutdown Facility Diesel Fuel Oil Tank Inspection will provide evidence that can be applied to the Essential Siphon Vacuum System and Siphon Seal Water System. The staff review of the preventive maintenance activities is discussed in Section 3.2.10 of the Safety Evaluation Report. Based on its review, the staff concluded that the applicant has demonstrated that these activities will adequately manage the aging effects of components in an underground environment.

Table 1-1

Aging Management Review Summary – Essential Siphon Vacuum System

Component Type	Component Function	Material	Internal Environment	Aging Effects	Programs
Pump	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Pump	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Tank	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Tank	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Level Glass	Pressure Boundary	Glass	Air (Note 1)	None identified	None Required
Level Glass	Pressure Boundary	Glass	Raw Water	None identified	None Required
Valve	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Valve	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Orifice	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Orifice	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Pipe	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Pipe	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Tubing	Pressure Boundary	Stainless Steel	Air (Note 1)	Loss of Material	Service Water Piping Corrosion Program (as modified)
Tubing	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)

Note 1: Normal air portions may have intermittent exposure to raw water.

Table 1-2

Aging Management Review Summary – Siphon Seal Water System

Component Type	Component Function	Material	Internal Environment	Aging Effects	Programs
Annubar	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
				Fouling	System Performance Testing Activities
Orifice	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
				Fouling	System Performance Testing Activities
Pipe	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
				Fouling	System Performance Testing Activities
Strainer	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
	Filtration			Fouling	System Performance Testing Activities
Tubing	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
Valve	Pressure Boundary	Stainless Steel	Raw Water	Loss of Material	Service Water Piping Corrosion Program (as modified)
				Fouling	System Performance Testing Activities

1.2 Structural Integrated Plant Assessment

1.2.1 Structures and Structural Components Subject to Aging Management Review

The Essential Siphon Vacuum Trenches and the Essential Siphon Vacuum Building are structures that were added as a part of an Oconee plant modification to add the Essential Siphon Vacuum and Siphon Seal Water Systems.

1.2.1.1 ESSENTIAL SIPHON VACUUM TRENCHES

The Essential Siphon Vacuum Trenches include the Essential Siphon Vacuum System Intake Dike Trench and the Essential Siphon Vacuum System Cable Trench. The Essential Siphon Vacuum Trenches are reinforced concrete trenches similar in design and construction to those trenches described in Section 2.7.5.10 of Exhibit A of the Application. These trenches are provided to allow underground routing of cables and piping. The staff review of Oconee trenches is provided in Section 2.2.3.6.8 of the Safety Evaluation Report (June 1999).

The Essential Siphon Vacuum Trenches are Class 2 structures. Class 2 structures are those whose limited damage would not result in a release of radioactivity and would permit a controlled plant shutdown but could interrupt power generation [Reference Section 3.2.1.1.2 of the Oconee UFSAR]. Class 2 structures have been determined to meet the intent of §54.4(a)(2).

1.2.1.2 ESSENTIAL SIPHON VACUUM BUILDING

The Essential Siphon Vacuum Building encloses portions of the Essential Siphon Vacuum System and the Siphon Seal Water System. The building is a pre-engineered metal building supported on a reinforced concrete foundation. The building is a single story, single span, rigid frame design. The Essential Siphon Vacuum Building is designed for the maximum hypothetical earthquake. The codes and standards used for the Essential Siphon Vacuum Building design and fabrication, including applicable edition are specified in Section 3.8.5.2 of the Oconee UFSAR.

The Essential Siphon Vacuum Building is a Class 2 structure. Class 2 structures are those whose limited damage would not result in a release of radioactivity and would permit a controlled plant shutdown but could interrupt power generation [Reference Section 3.2.1.1.2 of the Oconee UFSAR]. Class 2 structures have been determined to meet the intent of §54.4(a)(2).

The Essential Siphon Vacuum Building concrete design complies with the American Concrete Institute (ACI) 318-63. The concrete design and construction is similar to other structures described in Section 2.7 of Exhibit A of the Application. The concrete components within the Oconee Essential Siphon Vacuum Building and their intended functions are listed in Table 1-3 below.

The Essential Siphon Vacuum Building steel design complies with AISC *Manual of Steel Construction.* Structural steel is primed with a rust inhibitive primer. The steel design and construction is similar to other structures described in Section 2.7 of the Application. The steel components within the Oconee Essential Siphon Vacuum Building and their intended functions are listed in Table 1-3 below.

The staff review of the methodology to identify the structures and structural components that require an aging management is provided in Section 2.1 of the Safety Evaluation Report (June 1999). Based on its review, the staff found that the methodology used by Duke to identify the structures and structural components that require an aging management review is consistent with the requirements of the rule. Duke used this methodology to review the Essential Siphon Vacuum Building. Based on its review of Section 2.7 of the Application as documented in Section 2.2.3.6 of the Safety Evaluation Report, the staff determined that there is reasonable assurance that the methodology used by Duke has properly identified the structures and structural components that are subject to an aging management review.

Table 1-3

Essential Siphon Vacuum Building Components and Their Intended Functions

Component	Intended Functions (identified in the note below)											
	1	2	3	4	5	6	7	8	9	10	11	12
Concrete												
Anchorage	--	2	--	--	--	--	7	--	--	--	--	--
Embedments	--	2	--	--	--	--	7	--	--	--	--	--
Equipment Pads	--	2	--	--	--	--	7	--	--	--	--	--
Flood Curbs	--	--	--	--	--	--	--	8	--	--	--	--
Foundation	--	2	--	--	--	--	7	--	--	--	--	--
Steel in Air Environment												
Anchorage/Embedments (Exposed Surfaces)	--	2	--	--	--	--	7	--	--	--	--	--
Cable Tray & Conduit	--	2	--	--	--	--	7	--	--	--	--	--
Cable Tray & Conduit Supports	--	2	--	--	--	--	7	--	--	--	--	--
Checkered Plate	--	--	3	--	--	--	--	--	--	--	--	--
Electrical & Instrument Panels & Enclosures	--	2	3	--	--	--	7	--	--	--	--	--
Equipment Component Supports	--	2	--	--	--	--	7	--	--	--	--	--
Expansion Anchors	--	2	--	--	--	--	7	--	--	--	--	--
Instrument Line Supports	--	2	--	--	--	--	7	--	--	--	--	--
Instrument Racks & Frames	--	2	--	--	--	--	7	--	--	--	--	--
Louvers & Vents	--	2	--	--	--	--	7	--	--	--	--	--
Pipe Supports	--	2	--	--	--	--	7	--	--	--	--	--
Structural Steel Beams, Columns, Plates, Trusses	--	2	--	--	--	--	7	--	--	--	--	--

Note:

1. Provides pressure boundary and/or fission product barrier.
2. Provides structural and/or functional support to safety-related equipment.
3. Provides shelter/protection to safety-related equipment (including radiation shielding).
4. Provides rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant.
5. Provides source of cooling water for plant shutdown.
6. Serves as missile (internal or external) barrier.
7. Provides structural and/or functional support to non-safety related equipment where failure of this structural component could directly prevent satisfactory accomplishment of any of the required safety-related functions.
8. Provides a protective barrier for internal/external flood event.
9. Provides path for release of filtered and unfiltered gaseous discharge.
10. Impounds water for ultimate heat sink during loss of Lake Keowee.
11. Provides heat sink during SBO and design basis accidents.
12. Impounds water for power generation at Keowee Hydro Station.

1.2.2 Aging Management Review

Table 1-3 above identifies the structural components that are located within the Essential Siphon Vacuum Building. The bounding ambient environment temperature within the Essential Siphon Vacuum Building is 125 °F. There is negligible radiation. The following is a description of the aging effects applicable to the structural components within the Essential Siphon Vacuum Building. The results of the aging management review are summarized in Table 1-4 below.

1.2.2.1 ESSENTIAL SIPHON VACUUM TRENCHES

The aging management review of trenches is contained in Section 3.7 of Exhibit A of the Application, specifically Section 3.7.10. As summarized in Table 3.7-8 of the Application, no applicable aging effects have been identified for trenches and, thus, no aging management program is required. The staff review of Oconee aging effects for concrete structural components, which include trenches, is provided in Section 3.8.3.1.1 of the Safety Evaluation Report (June 1999). Based on its review and pending acceptable resolution of Open Items listed in Section 3.8 of the Safety Evaluation Report, the staff found that the Duke approach for the determination of applicable aging effects that could result in loss of function of concrete structural components reasonable and acceptable.

1.2.2.2 ESSENTIAL SIPHON VACUUM BUILDING

1.2.2.2.1 CONCRETE COMPONENTS

Essential Siphon Vacuum Building concrete components are exposed to different service environments depending on their location. Below grade portions of the foundation are exposed to backfill and groundwater. The groundwater chemistry plays a major role in the determination of the degradation of the below grade components. The concrete components, which are located internal to the Essential Siphon Vacuum Building, are protected from external weather changes, but may be exposed to high temperature and humidity.

The identification of applicable aging effects for concrete components is described in Section 3.7.2.1 of Exhibit A of the Application. For the Essential Siphon Vacuum Building concrete components the applicable aging effect is cracking of the equipment pads. This aging effect must be adequately managed so that the intended functions listed in Table 1-3 above will be maintained consistent with the current licensing basis for the period of extended operation.

The staff review of the aging effects of concrete components is provided in Section 3.8.3.1.1 of the Safety Evaluation Report (June 1999). Based on its review and pending acceptable resolution of Open Items listed in Section 3.8 of the Safety Evaluation Report, the staff found that the Duke approach for the determination of applicable aging effects that could result in loss of function of concrete structural components reasonable and acceptable.

The following program that is described in Section 4.19 of the Application will manage the applicable aging effect:

- Inspection Program for Civil Engineering Structures and Components

The staff review of the Inspection Program for Civil Engineering Structures and Components is provided in Section 3.2.6 of the Safety Evaluation Report. Based on its review, the staff concluded that the applicant has demonstrated that this program will adequately manage aging effects associated with civil engineering structures and components for the period of extended operation.

1.2.2.2.2 STEEL COMPONENTS IN AN AIR ENVIRONMENT

Steel components are completely enclosed inside the walls of the Essential Siphon Vacuum Building. The temperature and radiation exposure levels are less than the threshold levels where degradation may occur. Steel can corrode where the protective coating is destroyed or otherwise removed and both oxygen and water are present.

The identification of applicable aging effects for steel components is described in Section 3.7.2.2 of Exhibit A of the Application. Loss of material is the aging effect that is applicable to the steel components within the Essential Siphon Vacuum Building. This aging effect must be adequately managed so that the intended functions listed in Table 1-3 above will be maintained consistent with the current licensing basis for the period of extended operation.

The staff review of the aging effects of steel components in an air environment is provided in Section 3.8.3.1.2 of the Safety Evaluation Report (June 1999). Based on its review, the staff found that the Duke approach for the determination of applicable aging effects for structural steel components in an air environment is reasonable and acceptable.

The following program that is described in Section 4.19 of the Application will manage the applicable aging effect:

- Inspection Program for Civil Engineering Structures and Components

The staff review of the Inspection Program for Civil Engineering Structures and Components is provided in Section 3.2.6 of the Safety Evaluation Report. Based on its review, the staff concluded that the applicant has demonstrated that this program will adequately manage aging effects associated with civil engineering structures and components for the period of extended operation.

Table 1-4

Applicable Aging Effects of Essential Siphon Vacuum Building Components

Component	Applicable Aging Effect(s)	Aging Management Programs
Concrete		
Anchorage (in concrete)	None identified	None required
Embedments (in concrete)	None identified	None required
Equipment Pads	Cracking	Inspection Program for Civil Engineering Structures and Components
Flood Curbs	None identified	None required
Foundation	None identified	None required
Steel In Air Environment		
Anchorage/Embedments (exposed surfaces)	Loss of material	Inspection Program for Civil Engineering Structures and Components
Cable Tray & Conduit	None identified	None required
Cable Tray & Conduit Supports	Loss of material	Inspection Program for Civil Engineering Structures and Components
Checkered Plate	Loss of material	Inspection Program for Civil Engineering Structures and Components
Electrical & Instrument Panels & Enclosures	None identified	None required
Equipment Component Supports	Loss of material	Inspection Program for Civil Engineering Structures and Components
Expansion Anchors	Loss of material	Inspection Program for Civil Engineering Structures and Components
Instrument Line Supports	Loss of material	Inspection Program for Civil Engineering Structures and Components
Instrument Racks & Frames	Loss of material	Inspection Program for Civil Engineering Structures and Components
Pipe Supports	Loss of material	Inspection Program for Civil Engineering Structures and Components
Structural Steel Beams, Columns, Plates & Trusses	Loss of material	Inspection Program for Civil Engineering Structures and Components

2. REVISED STEAM GENERATOR TUBE RUPTURE ACCIDENT ANALYSIS

On July 30, 1997, Duke submitted Topical Report DPC-NE-3005-P, "UFSAR Chapter 15 Transient Analysis Methodology," to the NRC for review and approval. This topical report describes the new methodology for analyzing the UFSAR Chapter 15 non-LOCA transients and accidents. One of these accidents that has been re-analyzed is the Steam Generator Tube Rupture Accident.

The NRC approved DPC-NE-3005-P, with some exceptions, in a Safety Evaluation Report issued October 1, 1998. Duke addressed these exceptions in a letter to the staff on February 1, 1999. Subsequently, the NRC issued a letter dated May 25, 1999 that concluded the staff review of DPC-NE-3005-P.

By letter dated April 5, 1999, Oconee submitted a license amendment request to support the operation of Oconee Unit 2 during Cycle 18. The Unit 2 outage is scheduled for the fall of 1999. This license amendment is based on analyses performed using the methodology contained in DPC-NE-3005-P. For Units 1 and 3, the analyses are planned for completion in 1999. This revised Steam Generator Tube Rupture Accident analysis is a change to the Oconee current licensing basis.

The revised Steam Generator Tube Rupture Accident analysis incorporates a new mitigation strategy that relies on reactor coolant pump operation for the first minutes of the accident. The reactor coolant pumps are cooled by the Component Cooling System. The Component Cooling System is an auxiliary system that is described in Section 9.2.1 of the Oconee UFSAR. Components in the Component Cooling System are within the scope of license renewal. The revised Steam Generator Tube Rupture Accident analysis results in additional function of heat transfer for the component coolers that are presently in scope (See Table 2.5-9, page 2.5-64, of Exhibit A of the Application) have an additional function of heat transfer. These changes constitute a material change to the contents of the Application submitted July 6, 1998.

The revised Steam Generator Tube Rupture Accident analysis does not result in any other changes to the contents of the Application. Electrical components in this revised analysis are bounded by the existing electrical integrated plant assessment contained in the Application. Likewise, the existing structural integrated plant assessment bounds the structures and structural components, including pipe hangers, associated with this revised analysis.

The following subsections provide the Component Cooling System integrated plant assessment.

2.1 Components Subject to Aging Management Review

The Component Cooling System is within the scope of license renewal. Section 2.5.4.2 of Exhibit A of the Application describes the portion of the Component Cooling System that provides a containment isolation function. The revised Steam Generator Tube Rupture Accident

analysis causes additional portions of the Component Cooling System to be within the scope of license renewal. Therefore, in addition to this function, the Component Cooling System also provides cooling water to various components in the Reactor Building including the reactor coolant pump coolers and jackets.

The component coolers are described in Section 3.5.6.5 and Table 3.5-4 of Exhibit A of the Application. These coolers are required for the pressure boundary function of the Low Pressure Service Water System as well as the heat transfer function in support of the Component Cooling System functions.

The license renewal portions of the Component Cooling System are designed and constructed to the requirements of Oconee System Piping Classes F and G. Class F components are capable of withstanding an earthquake without loss of function. The materials of construction for the components in this system are admiralty brass, brass, carbon steel, copper, and stainless steel. Only brass and copper were identified as new materials of construction as a result of the expanded license renewal scope. The mechanical components that are subject to aging management review are listed in Table 2-1 below.

2.2 Aging Management Review

2.2.1 Environments

The internal surfaces of the Component Cooling System components and portions of the component coolers are exposed to a treated water environment. The applicable aging effects for the admiralty brass, brass, carbon steel, copper, and stainless steel materials in the treated water environment are identified in Section 3.5.2.5 of Exhibit A of the Application.

Portions of the component coolers are exposed to a raw water environment. The applicable aging effects for admiralty brass and carbon steel in the raw water environment are identified in Section 3.5.2.4 of Exhibit A of the Application.

Additionally, a portion of the internal surface of the Component Cooling System carbon steel tank is exposed to an air environment. The applicable aging effects for the carbon steel exposed to an air environment are identified in Section 3.2.5.1 of Exhibit A of the Application.

The external surfaces of the Component Cooling System components are exposed to the ambient conditions within the Reactor Building or Auxiliary Building. The applicable aging effects for brass, carbon steel, copper, and stainless steel exposed to these ambient environments are discussed in Sections 3.5.2.7.1 and 3.5.2.7.2 of Exhibit A of the Application.

As a result of the expanded license renewal scope for the Component Cooling System, the internal air environment is the only new environment identified.

2.2.2 Applicable Aging Effects

The applicable aging effects for the system components and portions of the component coolers exposed to treated water are the loss of material in the admiralty brass, brass, carbon steel, copper, and stainless steel components and cracking in the stainless steel components. The staff review of the aging effects of materials exposed to a treated water environment is provided in Section 3.1.3.1.5 of the Safety Evaluation Report (June 1999). Based on its review, the staff concurred with conclusions contained in the Oconee Application concerning the identification of aging effects of admiralty brass, brass, carbon steel, copper, and stainless steel exposed to treated water.

The applicable aging effect for the portion of the tank exposed to air is loss of material in the carbon steel tank. The staff review of the aging effects of materials exposed to an air/gas environment is provided in Section 3.1.3.1.1 of the Safety Evaluation Report (June 1999). Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Open Item 3.1.1-1, the Oconee Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

The applicable aging effects for the portions of the component coolers exposed to raw water are the loss of material in the brass and carbon steel components and fouling of the brass tubes. The staff review of the aging effects of materials exposed to a raw water environment is provided in Section 3.1.3.1.4 of the Safety Evaluation Report (June 1999). Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Open Item 3.1.1-1, the Oconee Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

Similarly, the applicable aging effect for carbon steel component external surfaces exposed to the Auxiliary Building and Reactor Building ambient environments is loss of material due to boric acid wastage, galvanic corrosion, and general corrosion. Loss of material due to boric acid wastage is also an applicable aging effect of brass and copper tubing external surfaces exposed to the Auxiliary and Reactor Building ambient environments. The staff review of the aging effects of materials exposed to Reactor Building and Auxiliary Building ambient environments is provided in Sections 3.1.3.1.7.1 and 3.1.3.1.7.2 of the Safety Evaluation Report (June 1999). Based on its review, the staff concurred with conclusions contained in the Oconee Application concerning the identification of aging effects for brass, carbon steel, and copper component external surfaces exposed to Auxiliary Building and Reactor Building ambient environments.

Loss of material of the carbon steel tank internal surfaces exposed to air, loss of material of brass and copper tubing external surfaces, and fouling of the component coolers tubing are the new aging effects identified as a result of the expansion of the scope of license renewal.

2.2.3 Aging Management Programs

The applicable aging effects must be adequately managed so that the intended functions will be maintained consistent with the current licensing basis for the period of extended operation. The applicable aging effects for the Component Cooling System components will be managed by monitoring and controlling the aging effects directly or the relevant conditions that contribute to the onset and propagation of a specific aging effect.

For loss of material in the components exposed to treated water and the portion of the tank exposed to air, the Chemistry Control Program described in Section 4.6 of Exhibit A of the Application will manage the applicable aging effects for all components including those added to the scope of license renewal. The staff review of the Chemistry Control Program is provided in Section 3.2.2 of the Safety Evaluation Report (June 1999). Based on its review, the staff concluded that the applicant has demonstrated that these programs would adequately manage the aging effects associated with the system components in the Component Cooling System.

Cracking in the stainless steel components exposed to treated water will be managed by the Treated Water Systems Stainless Steel Inspection as described in Section 4.3.13 of Exhibit A of the Application. The staff review of the Treated Water Systems Stainless Steel Inspection is provided in Section 3.2.11.4 Safety Evaluation Report (June 1999). Based on its review, the staff concluded that the applicant has demonstrated that the Treated Water Systems Stainless Steel Inspection will adequately manage the aging effects associated with cracking of components exposed to a treated water environment for the period of extended operation.

For the portions of the cooler exposed to raw water, the following programs will manage the effects of aging for the period of extended operation:

- Service Water Piping Corrosion Program (as modified by the collective Duke response to Safety Evaluation Report Open Items 3.2.13-1 through 3.2.13-4),
- Galvanic Susceptibility Inspection,
- Preventive Maintenance Activities – Component Cooler Tubing Examination, and
- Heat Exchanger Performance Testing Activities

Each of these programs is described in the following paragraphs.

Loss of material of the brass tubing and carbon steel channel heads of the Component Coolers exposed to a raw water environment will be managed by the Service Water Piping Corrosion Program. This program is described in Section 4.25 of Exhibit A of the Application and subsequently modified by the collective Duke response to Safety Evaluation Report (June 1999) Open Items 3.2.13-1, 3.2.13-2, 3.2.13-3 and 3.2.13-4. The staff review of the Service Water Piping Corrosion Program is provided in Section 3.2.13 of the Safety Evaluation Report. Based on its review, the staff concluded that, pending acceptable resolution of the Open Items

identified, the applicant has demonstrated that the Service Water Piping Corrosion Program will adequately manage the aging effects associated with a loss of material from corrosion for those systems that have components exposed to a raw water environment for the period of extended operation.

Loss material pof portions of the Component Coolers exposed to raw water will be managed by the Galvanic Susceptibility Inspection. This activity is described in Section 4.3.3 of Exhibit A of the Application. The staff review of the Galvanic Susceptibility Inspection is provided in Section 3.2.9.4 Safety Evaluation Report (June 1999). Based on its review, the staff concluded that the applicant has demonstrated that the Galvanic Susceptibility Inspection will adequately manage the aging effects associated with loss of material due to corrosion for those systems that have components exposed to a raw water environment for the period of extended operation.

Loss of material of the admiralty brass tubes in the Component Coolers will be managed by the Preventive Maintenance Activities – Component Cooler Tubing Examination. This activity is described in the Duke response to NRC request for information (RAI) 4.3.8-1 submitted by letter dated December 14, 1998. The staff review of the Preventive Maintenance Activities – Component Cooler Tubing Examination is provided in Section 3.2.10 Safety Evaluation Report (June 1999). Based on its review, the staff concluded that the applicant has demonstrated that this activity will adequately manage the aging effects associated with loss of material due to corrosion for the component cooler exposed for the period of extended operation.

Fouling of the admiralty brass tubes in the component coolers will be managed by the Heat Exchanger Performance Testing Activities described in Section 4.17 of Exhibit A of the Application. The staff review of the Heat Exchanger Performance Testing Activities is provided in Section 3.2.12 of the Safety Evaluation Report (June 1999). On the basis of its review, the staff concluded that this program would adequately manage this aging effect associated with the component coolers.

For the component external surfaces exposed to the Reactor Building and Auxiliary ambient environments, the Inspection Program for Civil Engineering Structures and Components and Boric Acid Wastage Surveillance Program credited in Sections 3.5.2.7.1 and 3.5.2.7.2 of Exhibit A of the Application will manage the applicable aging effects for the brass, carbon steel, and copper component external surfaces. Based on its review, the staff concluded that the applicant has demonstrated that these programs would adequately manage the aging effects associated with the system component external surfaces in the Component Cooling System.

Table 2-1

Aging Management Review Summary - Component Cooling System

Component Type	Component Function	Material	Internal Environment	Aging Effects	Programs
Filters	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Flexible Hose	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Flexible Hose	Pressure Boundary	Stainless Steel	Treated Water	Loss of Material	Chemistry Control Program
				Cracking	Treated Water Systems Stainless Steel Inspection
Orifices	Pressure Boundary	Stainless Steel	Treated Water	Cracking	Treated Water Systems Stainless Steel Inspection
				Loss of Material	Chemistry Control Program
Pipe	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Pipe	Pressure Boundary	Stainless Steel	Treated Water	Cracking	Treated Water Systems Stainless Steel Inspection
				Loss of Material	Chemistry Control Program
Pump Casings	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Tanks	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
			Air	Loss of Material	Chemistry Control Program
Tubing	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Tubing	Pressure Boundary	Copper	Treated Water	Loss of Material	Chemistry Control Program
Tubing	Pressure Boundary	Brass	Treated Water	Loss of Material	Chemistry Control Program
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water	Cracking	Treated Water Systems Stainless Steel Inspection
				Loss of Material	Chemistry Control Program

Table 2-1 (Continued)

Aging Management Review Summary - Component Cooling System

Component Type	Component Function	Material	Internal Environment	Aging Effects	Programs
Component Coolers					
HX Channel Heads	Pressure Boundary	Carbon Steel	Raw Water	Loss of Material	Galvanic Susceptibility Inspection Service Water Piping Corrosion Program (As Modified)
HX Shell	Pressure Boundary	Carbon Steel	Treated Water	Loss of Material	Chemistry Control Program
HX Tubes	Pressure Boundary	Admiralty Brass	Treated Water (Exterior Surface)	Loss of Material	Chemistry Control Program
	Heat Transfer			None identified	None required
HX Tubes	Pressure Boundary	Admiralty Brass	Raw Water	Loss of Material	Preventive Maintenance Activities - Component Cooler Tubing Examination
	Heat Transfer			Fouling	Heat Exchanger Performance Testing Activities
HX Tubesheet	Pressure Boundary	Admiralty Brass	Raw Water	Loss of Material	Service Water Piping Corrosion Program (As Modified)
HX Tubesheet	Pressure Boundary	Admiralty Brass	Treated Water	Loss of Material	Chemistry Control Program

3. FUNCTIONAL CHANGE OF THE REACTOR BUILDING AUXILIARY COOLERS

During normal operation, the Reactor Building Auxiliary Coolers provide cooling to the upper portions of the Oconee Reactor Buildings. At the time of Application submittal in July 1998, each Reactor Building Auxiliary Cooler was isolated from the Low Pressure Service Water System due to operability concerns with the coolers. Manual isolation valves on each cooler were closed. Thus, these Reactor Building Auxiliary Coolers were not within the scope of license renewal at the time of Application submittal.

Subsequently, the operability concerns with the coolers have been resolved. The manual isolation valves were opened and the Reactor Building Auxiliary Coolers are now in service during normal plant operation. This change of function was reflected in a recent revision to the Oconee UFSAR, Section 9.4.6.2. Thus, the change of cooler operation is a change to the Oconee current licensing basis.

The Low Pressure Service Water System piping to the Reactor Building Auxiliary Coolers is identified in the Application as within the scope of license renewal. At the time of the Application submittal, the Reactor Building Auxiliary Coolers were identified as being within scope but not subject to an aging management review since they did not perform a component intended function. Because the coolers are now in service during normal operation, they perform a pressure boundary function in support of the Low Pressure Service Water System functions within the scope of license renewal. The cooler coils serve to maintain the pressure boundary of the Low Pressure Service Water System. Heat transfer is not a required system intended function for license renewal. The addition of the coolers along with their pressure boundary function constitutes a material change to the contents of the Application that was submitted July 6, 1998.

The functional change of the Reactor Building Auxiliary Coolers does not result in any other changes to the contents of the Application. There are no electrical components involved with this change. The existing structural integrated plant assessment bounds the structures and structural components, including pipe hangers, associated with this change.

The following is the integrated plant assessment for the Reactor Building Auxiliary Coolers.

3.1 Components Subject to Aging Management Review

The Reactor Building Auxiliary Coolers are a part of the Reactor Building Ventilation System and are located in the Reactor Building. Four coolers that contain four cooling coils each are located in each Reactor Building. The coils are cooled by Low Pressure Service Water (raw water) on the tube side. Reactor Building Auxiliary Coolers are constructed of copper tubes and stainless steel headers. These coolers are within the scope of license renewal because they form a pressure boundary for the Low Pressure Service Water System and because they must remain intact for containment integrity. They are not required to perform a heat transfer function. The

attributes for these coolers that are subject to aging management review are listed in Table 3-1 below.

3.2 Aging Management Review

3.2.1 Environments

The internal surfaces of the Reactor Building Auxiliary Coolers are exposed to a raw water environment. The applicable aging effects for materials in the raw water environment are identified in Section 3.5.2.4 of Exhibit A of the Application. The external surfaces of the Reactor Building Auxiliary Coolers are exposed to a ventilation air environment within the Reactor Building. The applicable aging effects for materials exposed to this environment are discussed in Section 3.5.2.6 of the Application.

3.2.2 Applicable Aging effects

The Reactor Building Auxiliary Coolers are constructed of copper tubes and stainless steel headers connected to the Low Pressure Service Water System piping. The applicable aging effect for the copper tubes exposed to raw water is loss of material due to general corrosion, galvanic corrosion, pitting corrosion and microbiologically influenced corrosion. The applicable aging effect for the stainless steel parts of the coolers exposed to raw water is loss of material due to pitting corrosion and microbiologically influenced corrosion. The staff review of the aging effects of materials exposed to a raw water environment is provided in Section 3.1.3.1.4 of the Safety Evaluation Report (June 1999). Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Open Item 3.1.1-1, the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

The applicable aging effect for the external surfaces of the copper tubes and stainless steel headers exposed to a ventilation air environment is loss of material for the copper due to boric acid wastage. The staff review of the aging effects of materials exposed to a ventilation air environment is provided in Section 3.6.1.3.1 of the Safety Evaluation Report. Duke notes that Safety Evaluation Report Open Item 3.1.1-1 applies to this section of the Safety Evaluation Report. Based on its review, the staff concluded that, pending acceptable resolution of Safety Evaluation Report Open Item 3.1.1-1, the Application has included aging effects that are consistent with published literature and industry experience and that are acceptable to the staff.

3.2.3 Aging Management Programs

The loss of material for the internal and external surfaces of the copper tubes and the internal portions of the stainless steel headers exposed to raw water will be managed by the following program:

- Preventive Maintenance Activities – Reactor Building Auxiliary Cooler Inspection

The program is described below in Table 3-2 using the program attributes described in Section 4.2 of Exhibit A of the Application.

Table 3-1

Aging Management Review Summary - Reactor Building Auxiliary Coolers

Component Type	Component Function	Material	Internal Environment	Aging Effects	Programs
Cooler	Pressure Boundary	Copper	Raw Water	Loss of Material	Preventive Maintenance Activities – Reactor Building Auxiliary Cooler Inspection
		Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Activities – Reactor Building Auxiliary Cooler Inspection
Cooler	Pressure Boundary	Copper	Air (external surface)	Loss of Material	Preventive Maintenance Activities – Reactor Building Auxiliary Cooler Inspection
		Stainless Steel	Air (external surface)	None	None Required

Table 3-2

Preventive Maintenance Activities
Reactor Building Auxiliary Cooler Inspection - Activity Attributes

Purpose – The purpose of the Reactor Building Auxiliary Cooler Inspection is to inspect the coolers to determine their condition.

Scope – The scope of this inspection includes the interior and exterior of the copper tubes and stainless steel headers in the Reactor Building Auxiliary Coolers.

Aging Effects – Loss of material of copper tube due to general corrosion, galvanic corrosion, pitting corrosion, microbiologically influenced corrosion, and boric acid wastage. Loss of material of the stainless steel headers due to pitting corrosion and microbiologically influenced corrosion.

Method – The cooler is pressure tested and visually inspected for leaks.

Sample Size – This inspection is performed each refueling outage.

Industry Codes and Standards – No code or standard exists to guide or govern this inspection.

Frequency – One tube bundle (consisting of four coils) is pressure tested and visually inspected each outage, rotating the inspection among the four bundles.

Acceptance Criteria or Standard – No visible leakage resulting from pressure testing. No unacceptable visual indications of loss of material as determined by Engineering.

Corrective Action – Specific corrective actions are implemented in accordance with the Problem Investigation Process. The Problem Investigation Process applies to all structures and components within the scope of the Reactor Building Auxiliary Cooler Inspection.

Timing of New Program or Activity – The Reactor Building Auxiliary Cooler Inspection is a new activity. Following issuance of renewed operating licenses for Oconee Nuclear Station, this activity will be initiated at the first refueling outage of each unit following receipt of the renewed operating licenses for Oconee.

Administrative Controls – This inspection will be performed by controlled procedures. The responsible engineer may adjust the attributes of this inspection provided such changes do not adversely impact the capability of the activity to manage the effects of aging.

Regulatory Basis – This inspection has no current regulatory basis.

4. COMMITMENTS

Note: *Commitments are docketed statements that establish requirements or actions to be performed.*

1. The current licensing basis changes identified in this Amendment 1 to the Application affect the following aging management programs previously described in the Application for Renewed Operating Licenses for Oconee Nuclear Station (including responses to staff questions submitted on the docket under oath, and responses to safety evaluation report open items and confirmatory items):

   - Service Water Piping Corrosion Program (as modified by the collective Duke response to Safety Evaluation Report Open Items 3.2.13-1 through 3.2.13-4)
   - Inspection Program for Civil Engineering Structures and Components
   - Preventive Maintenance Activities
   - System Performance Testing Activities
   - Heat Exchanger Performance Testing Activities

   Duke will appropriately revise these aging management programs to reflect the current licensing basis changes identified and described in Amendment 1. No changes to the descriptions have been identified for all other aging management programs described in Amendment 1.

2. Duke will revise the UFSAR Supplement to add a description of the Reactor Building Auxiliary Cooler Inspection.