Draft Received May 19, 2003

L-2003-135
10 CFR 54

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Clarification of Florida Power and Light Company's Response to NRC
Request for Additional Information (RAI 2.1-2) for Review of the
St. Lucie Units 1 and 2 License Renewal Application

By letter dated July 1, 2002, the NRC requested additional information regarding the St. Lucie Units 1 and 2 License Renewal Application (LRA). By Florida Power and Light Company's (FPL) letter (L-2003-139) dated September 26, 2002, responses were provided to these Requests for Additional Information (RAI). By letter dated May 12, 2003, the NRC requested clarification to FPL's response to RAI 2.1-2 regarding Station Blackout (SBO). A revised response addressing the concerns identified in the May 12, 2003 letter is provided in Attachment 1.

Should you have any further questions, please contact S. T. Hale at (772) 467-7430.

Very truly yours,

W. Jefferson, Jr.
Vice President
St. Lucie Plant

WJ/STH/hlo
Attachment

Enclosure 3

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389

Clarification of FPL's Response for Additional Information (RAI 2.1-2) for Review of the St. Lucie Units 1 and 2 License Renewal Application

STATE OF FLORIDA)
) ss
COUNTY OF ST. LUCIE)

W. Jefferson, Jr. being first duly sworn, deposes and says:

That he is Vice President – St. Lucie of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

____
W. Jefferson, Jr.

Subscribed and sworn to before me this

______ day of _______________, 2003.

____

____
Name of Notary Public (Type or Print)

W. Jefferson, Jr. is personally known to me.

cc: U.S. Nuclear Regulatory Commission, Washington, D.C.
Program Director, License Renewal & Environmental Impacts
Project Manager, St. Lucie License Renewal
Project Manager, St. Lucie

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ST. LUCIE UNITS 1 AND 2
DOCKET NOS. 50-335 AND 50-389
ATTACHMENT 1
CLARIFICATION OF REQUEST FOR ADDITIONAL INFORMATION (RAI 2.1-2)
FOR REVIEW OF THE ST. LUCIE UNITS 1 AND 2
LICENSE RENEWAL APPLICATION

RAI 2.1 - 2

By a letter dated April 1, 2002, the NRC issued a staff position to the NEI, which clarified the use of alternate ac power sources within the context of the Station Blackout (SBO) Rule and described that the offsite power system, which is used to connect the plant to the offsite power source, should be included within the scope of license renewal. The implementation of this staff position will begin with license renewal applications that are currently under review, such as St. Lucie, Units 1 and 2.

Consistent with the staff position described in the aforementioned letter, please describe the process used to evaluate the SBO portion of the criterion defined in 10 CFR 54.4(a)(3). As part of your response, please list those additional SSCs included within scope as a result of your efforts, list those structures and components for which aging management reviews were conducted, and describe (as applicable for each structure or component) the aging management programs that will be credited for managing the identified aging effects.

FPL Response

The response below supersedes that response transmitted in FPL letter L2002-139 dated September 26, 2002. This response is being revised in its entirety to address NRC concerns with respect to silicone caulking and to provide the requested information regarding the non-segregated phase buses identified in the May 12, 2003 letter from the Staff.

Specific references regarding the Station Blackout (SBO) Current Licensing Basis (CLB) for St Lucie include Unit 1 UFSAR Section 15.2.13 and Unit 2 UFSAR Section 15.10, and references 2.1-21, 2.1-22, 2.1-23, 2.1-24, and 2.1-25 listed in Subsection 2.1.5 (page 2.1-18) of the St. Lucie License Renewal Application (LRA). Based on these references, SBO scoping for the St. Lucie LRA did not identify restoration of offsite power to be relied on or required under the SBO CLB for St. Lucie. Systems relied on for restoration of onsite power, however, were included in the scope of license renewal. In addition to the Emergency Diesel Generators, electrical systems identified as within the scope of license renewal for SBO included 480 V Electrical, 120/208 V Electrical, 120V Vital AC, 125 V DC, 4.16 kV Electrical, Communications, Reactor Protection, Containment Electrical Penetrations, Safeguards Panels, and the Data Acquisition Remote Terminal Unit.

FPL contends that restoration of offsite power is not relied on to meet the requirements of the SBO Rule for St. Lucie. However, based on the NRC guidance provided in the April 1, 2002 letter and RAI 2.1-2, FPL has performed an evaluation to determine the additional electrical and structural components that are in the scope of license renewal for restoration of offsite power at St. Lucie. For those electrical and structural components determined to be within the scope of license renewal and requiring an aging management review (AMR), an AMR evaluation was performed. The results of this evaluation are presented below.

Electrical Components

Consistent with the NRC position, the additional electrical components included in the scope of license renewal as meeting the scoping criteria of 10 CFR 54.4(a)(3) for restoration of offsite power are as follows:

1. Circuit breakers and switches to connect the Startup Transformer circuits to the grid
2. Batteries and DC controls associated with the Startup Transformer circuit breakers
3. Startup Transformers
4. Non-safety related 4.16 kV switchgear
5. DC control and power (lead sheath) cables
6. All Aluminum Alloy Conductor (Type AAAC) transmission conductors between the Startup Transformers and circuit breakers
7. High voltage insulators associated with the transmission conductors
8. Switchyard bus and connections between the Startup Transformers and circuit breakers
9. Non-segregated phase bus between the Startup Transformers and the non-safety related 4.16 kV switchgear

Based on the guidance in NEI 95-10, the circuit breakers, switches, batteries, DC controls, Startup Transformers, and the non-safety related 4.16 kV switchgear do not require an aging management review because they are considered active components. The DC control cable and power cable (lead sheath) insulation types were previously evaluated in the AMRs summarized in Section 3.6 of the LRA. An AMR evaluation of the remaining electrical components is presented below.

Type AAAC Transmission Conductors

The Type AAAC transmission conductors at St. Lucie are constructed of an aluminum core and strand.

The aging effects for transmission conductors requiring evaluation are loss of conductor strength and those associated with vibration. The most prevalent mechanism contributing to loss of conductor strength of transmission conductor is corrosion. Corrosion is not an aging mechanism of concern for Type AAAC transmission conductors, because they are constructed entirely of aluminum which is resistant to corrosion.

Further, the National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. The NESC also sets the maximum tension a conductor must be designed to withstand under heavy load requirements, which includes consideration of ice, wind, and temperature. The St. Lucie Units 1 and 2 conductors are 1081 MCM Type AAAC and they are designed and installed in accordance with NESC.

Tests performed by Ontario Hydroelectric showed a 30% loss of composite conductor strength of an 80-year-old transmission conductor. Assuming a 30% loss of strength, there would still be significant margin between what is required by the NESC and actual conductor strength.

Based on the above, loss of conductor strength of the St. Lucie Units 1 and 2 Type AAAC transmission conductors is not an aging effect requiring management for the period of extended operation. This is further supported by the fact that FPL has been installing and maintaining transmission conductors on its transmission system for more than 60 years and has not had to replace any conductors due to aging problems.

Transmission conductor vibration would be caused by wind loading. Wind loading that can cause a transmission line and insulators to vibrate is considered in the design and installation. Thus, loss of material (wear) and fatigue that could be caused by transmission conductor vibration or sway are not aging effects requiring management for the period of extended operation for St. Lucie Units 1 and 2.

In order to validate aging effects and to assure no additional aging effects exist beyond those discussed above, a review of industry experience was performed. This review included NRC generic communications and industry operating experience related to transmission conductors.

St. Lucie Units 1 and 2 operating experience was also reviewed to validate aging effects for transmission conductors. This review included non-conformance reports, license event reports, and condition reports for any documented instances of transmission conductor aging, in addition to interviews with responsible transmission engineering personnel. No unique aging effects were identified from this review beyond those discussed above.

High Voltage Insulators

High voltage insulators are constructed of the following materials:

- porcelain
- cement
- aluminum

Aging effects for high voltage insulators requiring evaluation are surface contamination and loss of material.

Various airborne materials such as dust, salt and industrial effluents can contaminate insulator surfaces. The buildup of surface contamination is gradual and in most areas such contamination is washed away by rain. The glazed insulator surface aids this contamination removal. This has been confirmed by St. Lucie operating experience.

Therefore, surface contamination of the St. Lucie Units 1 and 2 high voltage insulators is not an aging effect requiring management for the period of extended operation.

Loss of material due to mechanical wear is an aging effect for strain and suspension insulators if they are subject to significant movement. Movement of the insulators can be caused by wind blowing the supported transmission conductor, causing it to swing from side to side. If this swinging is frequent enough, it could cause wear in the metal contact points of the insulator string and between an insulator and the supporting hardware. Although this mechanism is possible, industry experience has shown that transmission conductors do not normally swing and that when they do, due to a substantial wind, do not continue to swing for very long once the wind has subsided. Wear has not been identified during routine inspections of the St. Lucie Units 1 and 2 high voltage insulators. Therefore, loss of material due to wear of the St. Lucie Units 1 and 2 high voltage insulators is not an aging effect requiring management for the period of extended operation.

In order to validate aging effects and to assure no additional aging effects exist beyond those discussed above, a review of industry experience was performed. This review included NRC generic communications and industry operating experience related to transmission insulators.

The following document related to insulators was identified in this review:

- IN 93-95, Storm-Related Loss of Offsite Power Events Due to Salt Buildup on Switchyard Insulators

High voltage insulators at St. Lucie are washed and coated with silicon to prevent salt buildup. As a result of this, no unique aging effects were identified in the above documents beyond those discussed in this section.

St. Lucie Units 1 and 2 operating experience was also reviewed to validate aging effects for transmission insulators. This review included non-conformance reports, license event reports, and condition reports for any documented instances of transmission insulator aging, in addition to interviews with responsible transmission engineering personnel. No unique aging effects were identified from this review beyond those identified above.

<u>Switchyard Buses and Connections</u>

The switchyard buses and connections are constructed of the following materials:

- aluminum
- bronze
- copper

Aging effects for the switchyard buses and connections requiring evaluation are those associated with vibration.

The switchyard buses are connected to flexible conductors that do not normally vibrate and are supported by insulators and ultimately by static, structural components such as cement footings and structural steel. With no connections to moving or vibrating equipment, vibration is not an applicable stressor for the switchyard buses and connections and aging effects due to vibration are not applicable. This has been confirmed by St. Lucie operating experience. Therefore, aging effects due to vibration of the St. Lucie Units 1 and 2 switchyard buses and connections do not require management for the period of extended operation.

In order to validate aging effects and to assure no additional aging effects exist beyond those discussed above, a review of industry experience was performed. This review included NRC generic communications and industry operating experience related to switchyard buses and connections. No documents involving switchyard buses and connections were identified.

St. Lucie Units 1 and 2 operating experience was also reviewed to validate aging effects for switchyard buses and connections. This review included non-conformance reports, license event reports, and condition reports for any documented instances of switchyard bus and connection aging, in addition to interviews with responsible transmission engineering personnel. No unique aging effects were identified from this review beyond those discussed above.

Non-segregated Phase Bus

The non-segregated bus ducts are routed between the startup transformers and the non-safety related 4.16KV switchgear buses. The non-segregated phase buses consist of copper bus bars and splice plates which are routed inside of steel ducts which provide structural support and shelter to the buses. The buses are internally insulated from the ducts by silicone caulking material and porcelain bus supports.

The non-segregated phase buses are constructed of the following materials:

- silicone caulk
- aluminum
- bronze
- copper
- galvanized metals
- stainless steel
- porcelain

Aging effects for the non-segregated phase buses requiring evaluation are those associated with temperature, precipitation, and vibration.

The only material above requiring evaluation with regard to aging effects associated with temperature is silicone caulk. The silicone caulk used in the non-segregated phase buses is Dow Corning Silastic 3110, which is a white, room temperature vulcanizing (RTV encapsulant), silicone rubber encapsulant. It is rated as having a useful upper temperature of 200°C (392°F). Dow Corning cannot provide Arrhenius data for this specific RTV; however, it is silicone rubber and its use temperature is consistent with other silicone rubbers which would imply the following thermal life data:

- 273°F (133.9°C) service temperature = 60-year life maximum temperature
- 176.0°F (80.0°C) continuous design service temperature (ambient 104oF plus self heating) of the non-segregated phase buses = life much greater than 60 years

The silicone caulk is located internal to the non-segregated phase bus ducts and is not exposed to the weather. Additionally, the 60-year life maximum temperature is much greater than the design service temperature of the silicone caulk. Therefore, there are no aging effects requiring management for silicone caulk for the extended period of operation.

The only materials in the above list requiring evaluation with regard to aging effects associated with precipitation are galvanized metals. Galvanized metals (bolts, washers, nuts and clamp screws) exposed to outside weather and precipitation are factory coated to inhibit corrosion. After more than 26 years in its service environment, loss of material due to corrosion has not been observed. Therefore, loss of material for galvanized metals associated with the non-segregated phase buses is not an aging effect requiring management.

The non-segregated phase buses are connected to static equipment that does not normally vibrate such as switchgear, transformers and disconnect switches. The non-segregated phase buses are supported by static structural components such as cement footings and building steel. Vibration is not an applicable stressor for these connections to non-moving and non-vibrating equipment and supports. Therefore, aging effects due to vibration do not require management.

In order to validate aging effects considered and to assure no additional aging effects exist beyond those discussed above, a review of industry experience was performed. This review included NRC generic communications and industry operating experience related to non-segregated phase buses. The following documents related to non-segregated phase buses were identified in this review:

- Bulletin 79-27, Loss of Non-Class 1E Instrumentation and Control Power System Bus During Operation
- Generic Letter 91-11, Resolution of Generic Issues 48, “LCOs for Class 1E Vital Instrument Buses,” and 49, “Interlocks and LCOs for Class 1E Tie Breakers” Pursuant to 10CFR 50.54(f)
- IN 86-87, Loss of Offsite Power Upon an Automatic Bus Transfer
- IN 86-100, Loss of Offsite Power to Vital Buses at Salem 2
- IN 88-55, Potential Problems Caused by Single Failure of an Engineered Safety Feature Swing Bus
- IN 89-64, Electrical Bus Bar Failures
- IN 91-57, Operational Experience on Bus Transfers
- IN 92-09, Overloading and Subsequent Lockout of Electrical Buses During Accident Conditions
- IN 92-40, Inadequate Testing of Emergency Bus Undervoltage Logic Circuitry
- IN 93-28, Failure to Consider Loss of DC Bus in Emergency Core Cooling System Evaluation May Lead to Nonconservative Analysis

No unique aging effects were identified in the above documents beyond those discussed in this section.

Additionally, as verbally requested by the Staff during a conference call on May 5, 2003, a review of IN 98-36, “Inadequate or Poorly Controlled, Non-Safety Related Maintenance Activities Unnecessarily Challenged Safety Systems”, and IN 2000-14, “Non-Vital Bus fault Leads to Fire and Loss of Offsite Power” was performed for applicability.

IN 98-36 notified licensees of various inadequate maintenance activities (e.g., failure to install gaskets or caulking of outdoor components) in the industry which resulted in moisture intrusion and challenges to safety related systems. As indicated in the description above, the silicone caulking utilized in the St. Lucie plant design serves the purpose of electrical insulation, not weather proofing and is located internal to the bus ducts. Therefore, no additional aging effects other than those previously evaluated were identified.

IN 2000-14 informed licensees of a transient at Diablo Canyon nuclear plant caused by a failure of a bus bar due to overheating at a splice joint. Potential causes of the failure include inconsistent silver plating of aluminum bus bars, currents approaching bus capacity, undersized splice plates, torque relaxation of connecting bolts, and undetected damage from a 1995 explosion of Auxiliary Transformer 1-1. The St. Lucie design is superior to that of Diablo Canyon. Key differences are summarized below:

1. The St. Lucie equipment specification required that all bus bars and splice plates be copper and all contact surfaces to be silver plated. Because they are copper, they are less susceptible to contraction and expansion experienced by the aluminum buses at Diablo Canyon.
2. The St. Lucie 4.16KV non-segregated phase buses operate at approximately 47% of their load rating. The Diablo Canyon buses are routinely loaded to 93% capacity.

3. St. Lucie buses have nearly a full face splice connection area.
4. The St. Lucie equipment specification requires use of Belleville washers with ½" bolting hardware. These washers are superior to the split washers utilized at Diablo Canyon.

Based upon this review, no additional aging effects, other than those previously evaluated, were identified

St Lucie operating experience was also reviewed to validate aging effects for the non-segregated phase buses. This review included non-conformance reports, license event reports, and condition reports for any documented instances of non-segregated phase bus aging, in addition to interviews with responsible engineering personnel. No unique aging effects were identified from this review beyond those discussed above.

Additional Clarifications to RAI 2.1-2 Response Requested by the Staff's May 12, 2003 Letter:

Clarification #1

Industry experience (i.e., IN 89-64) indicates that the potential exists for Noryl insulated medium voltage bus bars to experience catastrophic failure if they are not periodically inspected and maintained. Failures have occurred at the Palo Verde, Kewaunee, Millstone and Sequoyah plants. If bus bars at St. Lucie are insulated, then explain why failure of insulated bus bars are not a concern at St. Lucie.

FPL Response

Information Notice 89-64 was issued to address Noryl insulated medium voltage bus bars failures that occurred at several other nuclear facilities. The failures identified in Information Notice 89-64 were attributed to cracking of the Noryl bus bar insulation in combination with the accumulation of moisture or debris in the bus duct housings that provided a tracking path to ground. Noryl is the General Electric Trademark name for a plastic type electrical insulation material. The non-segregated buses at St. Lucie plant use silicone rubber for the bus bar insulation which has proven to be a good insulating material by providing more than twenty six years of trouble free service. No problems of the type noted in Information Notice 89-64 have been experienced at St. Lucie plant. An inspection of the non-segregated bus ducts at St. Lucie Plant was performed circa 1992. This inspection verified that the interior of the non-segregated bus ducts was clean and dry. There was no evidence of moisture intrusion or condensation present inside the bus ducts and no deterioration of the busbar insulation was noted.

The bus bars inside the bus duct are spaced 5.38" from each other and 4.62" from the bus duct. From Paschen's curve for electrical breakdown in air, a useful guideline is that one inch of spatial separation is required for each 10,000 volts of potential. For the 4.16KV voltage present at St. Lucie Plant, a spatial separation of 1" would be sufficient to prevent a fault to ground or a fault between phases. Therefore, even with no insulating material on the bus bars, with the spatial separation of 5.38" between phases and 4.62" between phase and ground in the St. Lucie bus ducts, no electrical breakdown would occur. The St. Lucie plant bus ducts are designed to prevent moisture from entering the bus work (See response to Question 2 below for design details). In addition, thermostatically controlled heaters are provided to maintain the temperature inside the ductwork at between 80°F and 110°F to prevent condensation formation. Therefore, the failure mechanism identified with Noryl insulated bus bars in medium voltage non-segregated bus ducts as described in Information Notice 89-64 is not applicable to the St. Lucie Plant.

Clarification #2

Describe the design of the non-segregated bus duct system at St. Lucie and explain why accumulation of water, dust or debris is not a concern, as identified in IN 89-64. Are there any ventilation openings in the bus ducts? If there are no openings, then explain how the bus duct is cooled. If there are openings, can moisture, dust or debris get into the ventilation openings?

FPL Response

The non-segregated bus ducts at St. Lucie plant are designed to provide a weather resistant enclosure that minimizes the potential for moisture and dust/particulate intrusion. These ducts are constructed of individual steel sections, approximately 6 to 8 feet in length, joined together with collars that are bolted to the individual bus duct sections. The collars are provided with channels that overlap the joints. Joints contain sponge strip or cement materials to provide a weather tight seal. The bus ducts are designed to minimize the potential for moisture intrusion by minimizing joints/seams. As such, the top and sides of the duct assembly are constructed of a single piece. Recessed bolted covers on the bottom of the bus ducts provide access for maintenance or repairs, if required. The bus ducts are provided with ventilation openings located at the top and with heaters at the bottom. The heater assemblies and vents are spaced at approximately 16 foot intervals along the length of the ducts. However, their locations on the ducts are offset from each other such that bus duct vents are spaced approximately 8 feet from the heaters. The bus ducts are provided with no openings other than for access through grillwork for the heaters located at the bottom. The ventilation openings at the top allow the exit of warm air, but exclude the entry of rain or debris by means of a labyrinth design. A filter assembly is provided beneath the heater sections of the bus duct to prevent intrusion of dust or particulate matter inside the bus ducts.

The bus bars internal to the bus duct sections are constructed of copper and are provided with silicone insulating material. The bus bars are insulated from the bus duct by individual ceramic insulators that are mounted in a steel framework inside the bus duct.

As indicated in the response to Question 1 above, past inspections of the non-segregated bus ducts has verified that the interior was clean and dry. There was no evidence of moisture intrusion or condensation present inside the bus ducts and no deterioration of the bus bar insulation was noted. Therefore, the accumulation of water and debris inside the non-segregated bus ducts, as described in Information Notice 89-64, is not a concern at St. Lucie plant.

Clarification #3

During the May 9, 2003 conference call between the Staff and the applicant, the applicant indicated that it will revise the Table 2.1-7 and Table 2.1-8 of the September 26, 2002 response to include the non-segregated bus ducts in the System and Structures Monitoring Program. How does the program inspect the waterproofing material (i.e., seals) for the non-segregated phase bus ducts?

FPL Response

As described above, the non-segregated bus duct is a sealed assembly that is designed to prevent the entry of water or debris into the bus ducts. More than twenty six years of operating experience at St. Lucie plant demonstrates the success of the bus duct design to prevent moisture intrusion. The only waterproofing material in the bus duct (i.e., seals) is the sponge strip/cement material that is installed in the coupling collar channels that joins the individual bus duct sections together. These coupling collars are an integral part of the bus and are not designed for periodic removal for inspection. Removal of the collars would require disassembly of the ducts and disturb the watertight integrity of the bus duct. Any moisture intrusion into the bus duct by way of the coupling collar and past the seal would come out at the low point of the bus at the nearest heater. This would be evident to operations department personnel or system engineering personnel during their system walk-down inspections. No further actions are considered necessary with respect to inspection of watertight seals for the bus ducts.

Based on the discussions above, the AMR results for electrical components required for restoration of offsite power are as follows:

TABLE 2.1-5
ADDITIONAL ELECTRICAL COMPONENTS REQUIRED FOR RESTORATION OF OFFSITE POWER FOR SBO

Component	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/ Activity
Transmission conductors	To electrically connect specified sections of an electrical circuit to deliver voltage, current, or signal	All Aluminum Alloy Conductor (Type AAAC)	Outdoor	None	None required
Non-segregated phase buses Switchyard buses and connections	To electrically connect specified sections of an electrical circuit to deliver voltage, current, or signal	Aluminum Bronze Copper Galvanized metals Stainless steel Silicone caulk Porcelain	Outdoor	None	None required
High voltage insulators	To electrically isolate and provide structural support to transmission conductors	Aluminum Cement Porcelain	Outdoor	None	None required

Based upon the AMR results, and a review of industry information, NRC generic communications, and St. Lucie operating experience, there are no aging effects requiring management for transmission conductors, non-segregated phase buses, switchyard buses, connections, and high voltage insulators for the extended period of operation.

Structural Components

Consistent with the NRC position, the additional structural components included in the scope of license renewal as meeting the scoping criteria of 10 CFR 54.4(a)(3) for restoration of offsite power are as follows:

1. Switchyard
   - Startup Transformer circuit breaker foundations
   - Covered cable trenches
   - Electrical component supports
   - Switchyard control building
   - DC electrical enclosures
   - Cable trays
   - Startup Transformer circuit breaker electrical enclosures
   - Transmission towers
   - Transmission tower foundations
2. Turbine Buildings
   - Switchgear rooms
   - Switchgear enclosures
   - Switchgear supports
   - Non-segregated phase bus duct and supports
3. Yard Structures
   - Transmission towers
   - Non-segregated phase bus duct and supports
   - Non-segregated phase bus foundations
   - Startup Transformer foundations
   - 4.16 kV Switchgear foundations
   - Transmission tower foundations
   - Electrical duct banks and manholes already included in LRA Table 3.5-16 (page 3.5-93)

An AMR evaluation of these components based on AMRs of St. Lucie structural components of the same materials exposed to the same environments yields the results presented below in three tables (one for each structure).

TABLE 2.1-6
SWITCHYARD ADDITIONAL STRUCTURAL COMPONENTS
REQUIRED FOR RESTORATION OF OFFSITE POWER FOR SBO

Component	Intended Function[2]	Material	Environment	Aging Effects Requiring Management	Program/Activity
Startup Transformer circuit breaker foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
Covered cable trenches	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
Electrical component supports	10	Carbon steel	Indoor – air conditioned	None	None required
			Outdoor	Loss of material	Systems and Structures Monitoring Program
Switchyard control building	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
		Masonry (unreinforced)	Outdoor	Cracking	Systems and Structures Monitoring Program
		Weatherproofing	Outdoor	Loss of seal	Systems and Structures Monitoring Program
DC electrical enclosures	10	Carbon steel	Indoor – air conditioned	None	None required
Cable trays	10	Aluminum	Indoor – air conditioned	None	None required
Startup Transformer circuit breaker electrical enclosures	10	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Transmission towers	10	Galvanized carbon steel	Outdoor	None	None required
Transmission tower foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program

NOTES

1. The aging management reviews performed by FPL on above groundwater reinforced concrete did not identify any aging effects requiring management, however based on the NRC Staff position, FPL will inspect accessible surfaces of above groundwater reinforced concrete structures and structural components for concrete degradation.

2. Intended Function 10 is defined in LRA Table 3.5-1 (page 3.5-34) as follows, “Provide structural support and/or shelter to components required for FP, ATWS, and/or SBO events. (NOTE: Although not credited in the analyses for these events, these components have been conservatively included in the scope of license renewal.)”

TABLE 2.1-7
TURBINE BUILDING ADDITIONAL STRUCTURAL COMPONENTS REQUIRED FOR RESTORATION OF OFFSITE POWER FOR SBO

Component	Intended Function[2]	Material	Environment	Aging Effects Requiring Management	Program/Activity
Switchgear rooms	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
		Masonry (unreinforced)	Outdoor	Cracking	Systems and Structures Monitoring Program
		Weatherproofing	Outdoor	Loss of seal	Systems and Structures Monitoring Program
Switchgear enclosures	10	Carbon steel	Indoor – not air conditioned	Loss of material	Systems and Structures Monitoring Program
Switchgear supports	10	Carbon steel	Indoor – not air conditioned	Loss of material	Systems and Structures Monitoring Program
Non-segregated phase bus duct and supports	10	Carbon steel	Indoor – not air conditioned	Loss of material	Systems and Structures Monitoring Program

NOTES

1. The aging management reviews performed by FPL on above groundwater reinforced concrete did not identify any aging effects requiring management, however based on the NRC Staff position, FPL will inspect accessible surfaces of above groundwater reinforced concrete structures and structural components for concrete degradation.
2. Intended Function 10 is defined in LRA Table 3.5-1 (page 3.5-34) as follows, “Provide structural support and/or shelter to components required for FP, ATWS, and/or SBO events. (NOTE: Although not credited in the analyses for these events, these components have been conservatively included in the scope of license renewal.)”

TABLE 2.1-8
YARD STRUCTURES ADDITIONAL STRUCTURAL COMPONENTS
REQUIRED FOR RESTORATION OF OFFSITE POWER FOR SBO

Component	Intended Function[2]	Material	Environment	Aging Effects Requiring Management	Program/Activity
Transmission towers	10	Galvanized carbon steel	Outdoor	None	None required
Non-segregated phase bus duct and supports	10	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Non-segregated phase bus foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
Startup Transformer foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
4.16 kV switchgear foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program
Transmission tower foundations	10	Concrete	Outdoor	Concrete degradation[1]	Systems and Structures Monitoring Program

NOTES

1. The aging management reviews performed by FPL on above groundwater reinforced concrete did not identify any aging effects requiring management, however based on the NRC Staff position, FPL will inspect accessible surfaces of above groundwater reinforced concrete structures and structural components for concrete degradation.

2. Intended Function 10 is defined in LRA Table 3.5-1 (page 3.5-34) as follows, “Provide structural support and/or shelter to components required for FP, ATWS, and/or SBO events. (NOTE: Although not credited in the analyses for these events, these components have been conservatively included in the scope of license renewal.)”

Conclusion

Based on the evaluation performed consistent with the guidance of the NRC letter of April 1, 2002 regarding scoping for SBO for license renewal:

- For systems, the Units 1 and 2 Generation and Distribution systems and additional components in the in-scope Units 1 and 2 4.16 kV Electrical and DC Electrical systems are identified as within the scope of license renewal.
- For structures, the Switchyard and additional structural components in the in-scope Units 1 and 2 Turbine Buildings and Yard Structures are identified as within the scope of license renewal.
- The Systems and Structures Monitoring Program has been revised to include the components as noted in Tables 2.1-6, 2.1-7 and 2.1-8 above.