ST. LUCIE RAI CROSS-REFERENCE TABLE

Status *Draft RAIs that were not issued*

LRAItemNumber	*CrossReference*
Item	
2.2-2	7/31/02 ML022130182

Section 6 2 5 of the UFSARs for both units state that systems are provided in accordance with General Design Criterion 41 to control the concentration of hydrogen that may be released into containment following a LOCA. These systems are the containment hydrogen analyzers, the containment hydrogen recombiners and containment hydrogen purge. In LRA table 2 2-1, the hydrogen analyzers are scoped as part of the containment post-accident monitoring system, and the hydrogen purge system is scoped as part of the containment isolation system. However, Table 2 2-1 does not list the hydrogen recombiners LRA Table 4 1-1 and Section 4 4 1.48 reference TLAAs for the hydrogen recombiners Clarify whether the hydrogen recombiners are in the scope of license renewal If so, please state whether any enclosures and/or supports for the hydrogen recombiners are also in the scope of license renewal and subject to an AMR If not, please justify their exclusion

2 3 1 - 1	Became 2.3 1-1

Some piping connected to the boric acid makeup tanks shown on 1-CVCS-04 and 2-CVCS-03 (locations D2 and D3) are shown as non-safety-related The staff believes the pipes form part of the pressure boundary. Please revise Table 3.3-1 and drawings or justify their exclusion For Unit 1, a section of piping (location G6) between normally open valve FCV-2161 and normally closed valve FCV-2210Y is shown not within scope There is a similar section of piping for Unit 2 The staff believes the sections of piping are part of the pressure boundary Please revise the Table and drawings or justify their exclusion

2 3 1-4	6/21/02ML021780147

Borated water leakage through the pressure boundary in PWRs, and resulting borated water induced wastage of carbon steel is a potential aging degradation for the components. Reactor vessel head lifting lugs are considered to be such components requiring aging management However, if the components are currently covered under Boric Acid Wastage Surveillance Program, then it may not require additional aging management It appears that the subject components were not discussed in the license renewal application (LRA), and therefore, the staff requests the applicant to verify whether the components are within the surveillance program; and if not, to provide an explanation

Resolution· The information requested by the staff is contained in Figure 5 4-1 of the Updated Final Safety Analysis Report (UFSAR) for Unit 1 and in Figure 5 3-8 of the UFSAR for Unit 2. The reactor vessel head lifting lugs are welded to the reactor vessel head and are considered an integral part of the head As an integral part of the head, the lifting lugs are covered under the Boric Acid Wastage Surveillance Program

2.3 1-5 6/21/02ML021780147

As stated in Sections. 2.3 1 and 3 1.4 3 2, the Unit 1 thermal shield was permanently removed in 1983 due to damage The staff has noted that an evaluation for the reactor vessel internals component stresses were performed by the applicant without the thermal shield, and it was reported in the LRA that the results were found to be within the limits of the ASME Boiler and Pressure Vessel Code, Sec III, Subsection NG, 1972 Draft Edition. The staff also understands that one of the intended functions of thermal shield is to minimize irradiation induced degradation of the reactor pressure vessel and internals The staff, therefore, requests the applicant to indicate whether an analysis was done to determine any impact of removing the thermal shield on the time-limited aging analyses (TLAAs) performed for the reactor vessel and any internals, including, any impact on reactor vessel radiation embrittlement calculations If an analysis was performed, then the applicant should submit its result, and if not, then the applicant should justify why such analysis is unnecessary.

Resolution The information requested by the staff is available in the associated TLAAs and aging management program of the LRA In Section 4 2, "Reactor Vessel Neutron Embrittlement," of the LRA, the applicant describes a group of TLAAs concerning the effects of irradiation embrittlement on St. Lucie, Units 1 and 2, reactor vessels over the period of extended operation Under the current licensing basis, the effects of the irradiation embrittlement of reactor vessel internals is managed by the aging management program described in Appendix B 3 3 12, "Reactor Vessel Internals Program," of the LRA

2.3.1-6 6/21/02ML021780147

It is stated in the FSAR (page 5.5-19 / Unit 1) that a RCP lube oil collection system is provided for each pump which will prevent a lube oil fire from propagating or damaging any safe shutdown equipment. The system consists of collection pans, drain piping and a collection tank, all of which are seismically supported Drain lines are prevented from coming in contact with hot reactor coolant piping It appears from the staff's review of the LRA that the subject system and its components have not been identified as within the scope of license renewal, and therefore, the staff requests the applicant to provide an aging management review (AMR) for the subject components, pursuant to 10 CFR 54.4(a)(3)

Resolution The information requested by the staff is available in Section 2.3 3 6 and in Table 3.3 6 of the LRA In Section 2 3 3.6 of the LRA, the applicant states that fire protection components subject to an aging management review include enclosures (reactor coolant pump oil collection) In Table 3.3-6 on page 3 3-45 of the LRA, the applicant documents the results of the aging management review performed for the reactor coolant pump oil collection tanks. The aging management programs identified for the tanks are the Systems and Structure Monitoring Program and the Boric Acid Wastage Surveillance Program.

2 3 1-7 6/21/02ML021780147

It was stated in page 2 3-7 of the LRA that the RCP flywheel is not subject to an AMR, and the staff concurs with the applicant's position. However, the staff understands that a TLAA is required to be performed for the component for the extended period of operation The staff has failed to identify a TLAA for the subject component in the LRA (Chapter 4) Please explain why.

Disposition This draft RAI will not be sent to the applicant The information requested is the same as the information requested by an RAI that will be issue for Section 4 1, "Identification of TLAAs," of the LRA

2.3 2.1-1* became RAI 2 3 2-2

The blowout panels between the fan coolers and ring header appear to perform a safety related function Please include blowout panels and any associated gaskets and closure bolts that support the pressure boundary intended function of the panels to Table 3 2-1 or justify their exclusion

2 3 2.1-2 became RAI 2 3 2-2

The diagrams of the Containment Cooling System provided in LRA Figures 1-HVAC-01 and 2-HVAC-02 for units 1 and 2, are not detailed enough to dtermine the intended system boundaries

* DRAFT RAIs SENT TO APPLICANT ON MAY 7, 2002

2 3.2.1-3 7/31/02 ML022130182

LRA Table 3 2-1 lists the following components/commodity groups as being applicable to Unit 1 only:

·□containment fan cooler housings,

·□containment fan cooler motor heat exchanger tubes,

·□containment fan cooler motor heat exchanger headers, and

·□valves.

Please include these components or their equivalents in Table 3.2-1 for Unit 2, or explain why these components are not in the scope of license renewal and subject to an AMR for Unit 2.

2.3 2 2-1 6/21/02ML021780147

In order to provide a reasonable assurance that the structures, components and intended functions of the containment spray system have been properly specified, the staff needs clarification of terms used to describe this system in the LRA:

1. The internal environment section of LRA Table 3 2-2 (page 3 2-14) lists a "NaOH Tank rupture disc (Unit 1 only)" component/commodity group that does not appear in the external environment section of that table. However, a "Rupture disc" component/commodity group is listed in the external environment section of Table 3 2-2 (page 3 2-19) that does not have a corresponding internal environment entry Clarify whether these two entries refer to opposite sides of the same component(s).

2. The external environment section of LRA Table 3 2-2 (page 3 2-19) lists a "Pipe/fittings" component/commodity group with an environment identified as "Outdoor (ECCS pipe tunnel)." However, LRA Figure 2 2-2 "Yard Structures" (page 2 2-8) does not show any pipe tunnels, but does show two concrete pipe trenches running from the condensate storage tank enclosure to the turbine buildings for each unit Clarify whether the "Pipe/fittings" components run in a tunnel or in a trench If these components do run in a tunnel, identify the location of this tunnel relative to the structures shown on LRA Figure 2 2-2

Resolution· This RAI will not be issued to the applicant For item 1, the applicant confirmed that the two entries refer to opposite sides of the same component For item 2, the difference between tunnels and trenches is the same question contained in draft RAI 3 3 11-3, which will be issued to the applicant

2.3.2 2-1* 7/31/02ML022130182

Need clarification of terms used to describe the system a) Table 3 2-2 (page 3 2-14) NaOH Tank ruture disc (Unit 1 only) is not included in Table 3 2-2 (page 3 2-19) "Rupture disc" component/commodity group list. b) Table 3.2-2 (page 3 2-19) ECCS pipe tunnel vs Table 3 2-2(page 2 2-8) concrete pipe trench

2 3.2 3-1* Became 2 3 2-3

The containment purge system includes vacuum relief system air accumulators on drawing 2-HVC-01 at location B7. These accumulators appear to perform safety related function associated with the containment pressure boundary Either correct the text of the LRA and drawing 2-HVAC-01 to indicate that these air accumulators have been screened as components of the instrument air system, or justify their exclusion from the scope of license renewal

2 3.2 4-1 Became 2.3 2-1

It appears that a section of piping in the return path from the HPSI discharge to the RWT is not within the scope of license renewal Please revise the safety injection piping LRA drawing to indicate the piping and valve body components are in scope of license renewal or justify their exclusion.

2 3 2.5-1 Closed by reviewer

The staff believes that the containment atmosphere radiation monitoring system beyound the outboard containment isolation valves is safety-related Please revise Table 3 2-5 and the referenced license renewal drawings to indicate that the lines and valves of the monitoring system are within scope or justify their exclusion

2 3.3 - 1 6/21/02ML021780147

LRA Table 3.3-1 and license renewal drawings, 1-CVCS-04 and 2-CVCS-03 (locations D2 and D3 on both drawings), show that the boric acid makeup tanks are in the scope of license renewal LRA Table 3 3-1 states that these tanks have a pressure boundary intended function. Some of the piping connected to the boric acid makeup tanks is shown on the drawings as not being within the scope of license renewal This includes piping to the gas collection header and to closed valves V2124 and V2135 The staff believes that these piping sections also form part of the same pressure boundary as the boric acid makeup tanks Please revise Table 3 3-1 and the referenced license renewal drawings to indicate that these piping and valve body components are in the scope of license renewal and subject to an AMR, or justify their exclusion.

Resolution. The information requested by the staff is available in the license renewal boundary drawings and the UFSAR. The piping is located at the top of the boric acid makeup tanks and are not pressurized The piping is above the minimum level of water required by technical specifications. The license renewal drawings indicate that the piping is classified as Quality Group D On page 3 2-3 of the St. Lucie Unit 2 UFSAR, the applicant states that Quality Group D applies to those components not related to nuclear safety

2.3 3 - 2 6/21/02ML021780147

LRA Table 3 3-1 and license renewal drawings, 1-CVCS-04 and 2-CVCS-03 show that sections of piping between the boric acid makeup tank and the charging pump suction are within the scope of license renewal This piping is part of the makeup system which performs the intended function of injecting concentrated boric acid into the reactor coolant system (RCS) for reactivity control For Unit 1 (Drawing 1-CVCS-04) there is a section of piping (location G6) between normally open valve FCV-2161 and normally closed valve FCV-2210Y that is shown as not within the scope of license renewal A similar section of piping for Unit 2, shown on Drawing 2-CVCS-03 location F6, is shown as within the scope of license renewal The staff believes that the piping section for Unit 1 forms part of the makeup system pressure boundary and is within the scope of license renewal Please revise Table 3.3-1 and the referenced license renewal drawings to indicate that the subject piping and valve body components are in the scope of license renewal and subject to an AMR, or justify their exclusion

Resolution: The information requested by the staff is available in the license renewal boundary drawings prepared by the applicant Boundary drawing 1-CVCS-04 indicates that Unit 1 has an air operated valve that fails closed (FCV-2161) and serves as the pressure boundary Alternatively, boundary drawing 2-CVCS-3 indicates that Unit 2 has a manual valve at the same location and, therefore, the pressure boundary extends to the next air operated valve (FCV-2210Y).

2 3 3 11-1a 7/31/02 ML022130182

Table 3 3-11 of the LRA states that a vortex breaker (Unit 2 only) is included within the scope of license renewal serving a vortex prevention intended function Presumably the vortex breaker is in the 150,000 gallon Primary Water Storage Tank (License renewal drawing 2-PW-01 (location B3) However, no vortex breaker is shown on drawing 2-PW-01. Please clarify the location of the vortex breaker listed in Table 3.3-11.

2 3 3 11-1b 7/31/02 ML022130182

License renewal drawing 2-PW-01, location A3, shows a floating diaphragm located in the Primary Water Storage Tank. Based on a past history of failed materials becoming resident in water storage facilities at nuclear facilities, the staff believes that pieces of a failed diaphragm could enter the tank and prevent the vortex breaker from performing its intended function and may also limit the availability of water for fire protection purposes by clogging the vortex breaker and/or the system piping Please revise Table 3 3-11 to show that the floating diaphragm is in the scope of license renewal and subject to an AMR, or justify its exclusion.

2 3 3 11-1c 7/31/02ML022130182

License renewal drawing 2-PW-01, location B3, shows a manway on the primary water storage tank (drawing 2-PW-01, location B3). The seals and cover for this manway are not listed in Table 3 3-11 as being in the scope of license renewal and subject to an AMR. The staff believes that these items perform a pressure boundary function and, as such, are within the scope of license renewal Please revise Table 3 3-11 to show that the manway cover and seals are in the scope of license renewal and subject to an AMR, or justify their exclusion.

2 3 3 12-1a 7/31/02 ML022130182

UFSAR Sections 9 3 2.2.1, page 9 3-9 (Unit-1) and 9.3 2 2.1, page 9.3-7 (Unit-2) state that when shutdown cooling is in operation, samples are taken directly from the LPSI pump discharge header. During the recirculation period following a LOCA, samples are taken from the minflow sample points The safe shutdown function includes the capability to provide for process monitoring. Obtaining samples to check boron concentration of the water is an essential function necessary to assure maintaining a safe shutdown condition. License renewal drawings 1-SAMP-01 (location E3) and 2-SAMP-01 (location D3) indicate that piping, valves and heat exchangers beyond the normally closed isolation valves for these sample flow paths are not within the scope of license renewal When samples are taken from either location, the piping, valves and sample heat exchangers associated with these sample flow paths serve a pressure boundary function and therefore are within the scope of license renewal Please revise Table 3 3-12 and the referenced license renewal drawings to indicate that the subject portions of the sampling systems are in the scope of license renewal and subject to an AMR, or justify their exclusion

2.3.3 12-1a 7/31/02 ML022130182

UFSAR Sections 9.3 2 2.1, page 9 3-9 (Unit-1) and 9.3 2 2.1, page 9.3-7 (Unit-2) state that when shutdown cooling is in operation, samples are taken directly from the LPSI pump discharge header. During the recirculation period following a LOCA, samples are taken from the minflow sample points The safe shutdown function includes the capability to provide for process monitoring Obtaining samples to check boron concentration of the water is an essential function necessary to assure maintaining a safe shutdown condition License renewal drawings 1-SAMP-01 (location E3) and 2-SAMP-01 (location D3) indicate that piping, valves and heat exchangers beyond the normally closed isolation valves for these sample flow paths are not within the scope of license renewal When samples are taken from either location, the piping, valves and sample heat exchangers associated with these sample flow paths serve a pressure boundary function and therefore are within the scope of license renewal Please revise Table 3.3-12 and the referenced license renewal drawings to indicate that the subject portions of the sampling systems are in the scope of license renewal and subject to an AMR, or justify their exclusion.

2.3 3 12-1b 7/31/02 ML022130182

License renewal drawings, 1-SI-02, e g location A2 and 2-SI-02, e g location A7 show piping to the containment drain header. This piping is shown as not within the scope of license renewal Since the piping shown on the drawings is in the reactor building and the reactor auxiliary building, it appears that the piping penetrates the containment in order to reach the containment drain tanks The portion of the piping between the inboard and outboard isolation valves serves as the containment pressure boundary, and therefore is within the scope of license renewal. Justify the exclusion of the subject piping and valve body components from license renewal

2 3 3 12-1b 7/31/02 ML022130182

License renewal drawings, 1-SI-02, e g location A2 and 2-SI-02, e g. location A7 show piping to the containment drain header. This piping is shown as not within the scope of license renewal Since the piping shown on the drawings is in the reactor building and the reactor auxiliary building, it appears that the piping penetrates the containment in order to reach the containment drain tanks The portion of the piping between the inboard and outboard isolation valves serves as the containment pressure boundary, and therefore is within the scope of license renewal Please revise drawings 1-SI-02 and 2-SI-02 and the appropriate Tables in the LRA to indicate that the subject piping and valve body components are in the scope of license renewal and subject to an AMR, or justify their exclusion.

2 3 3 15-10 7/31/02 ML022130182

According to the LRA, the Unit 1 intake structure ventilation system is not in the scope of license renewal Confirm that the Unit 1 intake cooling water pumps do not require forced ventilation to perform their safety-related function or include these SCs in the scope of the license renewal and subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54.21(a)(1) or justify their exclusion

2.3 3.15-13 7/31/02 ML022130182

LRA Table 3 3-15 does not identify the components and their housings listed below, although these SCs and their housings, support the intended function of the Unit 1 miscellaneous ventilation system. These SCs are shown on Drawings 1-HVAC-01, Rev 0, and 1-HVAC-02, Rev. 0, as being in the scope of license renewal. Include these components in Table 3 3-15 or justify their exclusion from the scope of license renewal and being subject to an AMR

·□HVAC-10A and HVAC-10B at locations C8 and D8 (1HVAC-02., Rev. 0).

·□HVS-9 and HVE-35 at locations E7 and D7 (1-HVAC-01, Rev. 0) ,

·□Unlabeled damper and its housing, media for the filters and their housings, and a screen for the outside air inlet at locations E7 (1-HVAC-01, Rev. 0)

Include the above SCs in the LRA Table 3.3-15 for being subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 21(a)(1) or justify their exclusion

If the filter media for the components identified above were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

2 3.3 15-14 7/31/02 ML022130182

Clarify whether the battery room ventilation air supply at St Lucie Unit 1 pass through filters and other components as at Unit 2 If so, add these filter media and components to Table 3.3-5 of the LRA, or justify their exclusion. If the filter media identified above was excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

2 3 3 15-15 7/31/02 ML022130182

LRA Table 3.3-15 does not list the following SCs and/or housings listed below, although these components and/or housings, support the intended function of the electrical and battery room ventilation system. These components are shown on Drawings 1-HVAC-02, Rev. 0, (Unit 1), and 2-HVAC-02, Rev. 0, (Unit 2) as being within the scope of license renewal. Include these components in Table 3 3-15 for being subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 4(a)(2) or justify their exclusion:

Unit 1 LRA Drawing 1-HVAC-02, Rev. 0

·□Housings for battery room exhaust fans RV-1, RV-2 at location G3 an unlabeled gravity damper (GD) at location G3 ,

·□Housings for electrical equipment room fans HVS-5A, HVS-5B at locations G5, H5, RV-3, and RV-4 at locations G5, G6, HVE-11, HVE-12 at locations G6, H6 ,

·□Housings for electrical equipment room dampers L-11 at location G4; GD-1 and GD-2 at location G5, unlabeled dampers at locations G5, G6, and L-9 and L-10 at locations G6, H6.,

·□Media for the filters shown at G4

If the filter media for the components identified above were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

Unit 2 LRA Drawing 2-HVAC-02, Rev. 0

·□Housings for battery room exhaust fans RV-1, RV-2, RV-3, RV-4 at location H2 and unlabeled pressure damper (GD) at location G2 ,

·□Housings for electrical equipment room fans 2HVS-5A, 2HVS-5B at locations G3, H3,2 HVE-11, 2HVE-12 at location H4 ,

·□Housings for electrical equipment room dampers 2L-11 at location G3; GD-1 and GD-2 at locations G3, H3; 2FDPR-25-123 and 2FDPR-25-119 at location G4, GD-19, GD-20 at locations G4, H4 ,

·□Media for the filter(s) shown at G3.

If the filter media for the components identified above were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

2.3 3 15-16 7/31/02 ML022130182

LRA Table 3 3-15 does not list the following components and/or housings listed below, although these components and/or housings, support the intended function of the shield building ventilation system. These components are shown on LRA Drawings 1-HVAC-02, Rev. 0, and 2-HVAC-03, Rev. 0, as being within the scope of license renewal Include these components in Table 3.3-15 or justify their exclusion from the scope of license renewal and being subject to an AMR.

Unit 1 LRA Drawing 1-HVAC-02, , Rev. 0

·□Housings for fans HVE-6A, 6B at locations D7, F7.,

·□Housings for dampers GD-10 and D-23 at location D7; GD-11 and D-24 at location F7.,

·□Electrical coil housings and electrical heating coils EHC-HVE-6BZ and EHC-HVE-6AI at location D6, and EHC-HVE-6AZ and EHC-HVE-6BI at location F6.,

·□Demister housings and demister I-V-25-24 at location D6 and unlabeled demister at location F6 ,

·□Media for the four HEPA filters at locations D7 and F7, two charcoal adsorbers at locations D7, F7.

Unit 2 LRA Drawing 2-HVAC-03, Rev 0

·□Housings for fans 2HVE-6A, 6B at locations D6, F6 ,

□Housings for dampers GD-10 at location D6, D-23 at location D7; GD-11 at location F6; D-24 at location F7.,

·□Electrical coil housings and electrical heating coils EHC-2HVE-6AI at location D3, and EHC-2HVE-6BZ at location D4, EHC-2HVE-6BI at location F4, and EHC-2HVE-6AZ at location F3 ,

·□Demister housings and unlabeled demister (two) at location D3 and F3 ,

·□Media for the four HEPA filters at locations D4, D5, F4 and F5, two charcoal absorbers at locations D5, F5

If the filter media for the components identified above were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

2 3 3 15-4 7/31/02 ML022130182

LRA Table 3 3-15 does not identify the components and/or housings listed below, although these components and/or housings support the intended function of the control room ventilation system to comply with the requirements of the Appendix A to 10 CFR Part 50, GDC 19. These components are shown on LRA Drawings 1-HVAC-02, Rev. 0, and 2-HVAC-02, Rev 0, as being within the scope of license renewal Include these components in LRA Table 3 3-15 or justify the exclusion of these components and/or housings from the scope of license renewal and subject to an AMR:

Unit 1 on LRA Drawing 1-HVAC-02, Rev 0

□Direct expansion cooling coils and coil housings for in door HVAC units HVAC-3A, 3B and 3C, at locations A7, B7, C7.,

· □Filter media and filter housings (HVAC units HVAC-3A, 3B and 3C), at locations A7, B7, C7.,

·□High efficiency particulate air (HEPA) filter(s) and filter housings and charcoal absorbers and charcoal absorbers housings (for HVAC units HVE-13A, 13B) at locations B5 ,

· □Housings for dampers D-17 at location B5, D-18 at location B6, D-19 at location C6, GD-5 at location B6, GD-6 at location C6, D20 at location A7, D-21 at location B7, D22 at location C7, GD-7 at location A8, GD8 at location B8, GD-9 at location C8, D29A at location C4, D29B at location C5, D-41 at location C8, D-42 at location C7, unlabeled at location C8 and D8 .,

·□Housings for fans HVE-13A at location B6 and 13B at location C6, HVAC-3A, 3B and 3C at locations A7, B7, C7, respectively, and HVAC-10A and 10B at location D8 .,

·□Housings for outdoor air conditioning compressor units ACC-3A, 3B, 3C at locations A7, B7 and C7 .,

·□EHC-1 at location D7 and EHC-2 at location D8 and their associated ductwork to serve the technical support center.

·□Unit 2 on LRA Drawing 2-HVAC-02, Rev 0

□Direct expansion cooling coils and coil housings (for HVAC units 2HVA/ACC-3A, 3B and 3C) at locations A5, B5, C5 ,

· □Filter media and filter housings (for HVAC units 2HVA/ACC-3A, 3B and 3C) at locations A5, B5, C5.,

·□Prefilters, high efficiency particulate air (HEPA) filters and charcoal absorbers and their associated housings (for HVAC units 2HVE-13A, 13B) at locations A4, B4 .,

· □Housings for dampers D-17A at location A3, D-17B, D-20, D-21, and D-22 at location C3, D-18 at location A4, D-19 at location B4, GD-5 at location A4 and GD-6 at location B4, unlabeled at locations A5, B5, C5, GD-7 at location A6, GD-8 at location B6, GD-9 at location C6, DPR-25-2 at location A6, DPR-25-4 at location B6, DPR-25-3 at location C6; D39 at location C5 and D40 at location DC5 ,

·□Housings for fans 2HVE-13A at locations and A4, 2HVE-13B at location B4, housings for air handling unit fans, 2HVA/ACC-3A at location A6, 2HVA/ACC-3B at location B6, and 2HVA/ACC-3C at location C6

If the filter media for the components identified above were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement

2 3.3 15-4 7/31/02 ML022130182

LRA Table 3 3-15 does not identify the components and/or housings listed below, although these components and/or housings support the intended function of the control room ventilation system to comply with the requirements of the Appendix A to 10 CFR Part 50, GDC 19 These components are shown on LRA Drawings 1-HVAC-02, Rev. 0, and 2-HVAC-02, Rev. 0, as being within the scope of license renewal Include these components in LRA Table 3 3-15 or justify the exclusion of these components and/or housings from the scope of license renewal and subject to an AMR

2.3 3.15-6 7/31/02 ML022130182

The components/housings shown in LRA Drawing 1-HVAC-02, Rev. 0, for Unit 1, at coordinates D-5 and E-5 (downstream of the exhaust fans HVE-9A and HVE-9B) are shown in the scope of license renewal Include these SCs in LRA Table 3 3-15 as being subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 21(a)(1) or justify their exclusion from an AMR.

2.3 3.15-7 7/31/02 ML022130182

LRA Table 3 3-15 does not list the following components and housings listed below, although these components and housings, support the intended function of the emergency core cooling systems area ventilation system These components are shown on drawing 1-HVAC-02, Rev 0, and 2-HVAC-02, Rev. 0, as being within the scope of license renewal. Include these components in Table 3 3-15 or justify their exclusion from the scope of license renewal and being subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54.21(a)(1)·

Unit 1 LRA Drawing 1-HVAC-02, Rev. 0

· □Housings for fans HVS-4A and 4B at locations D2, E2; HVE-9A, 9B, at locations D5 and E5 .

·□Housings for dampers L-8 at location E1; GD-3 at location D2, GD-4 at location E2, D-1, D-2 , D-3, D-4 at location D3; D-8A, D-8B at location E3, GD-12 at location E3; D-7A, D-7B at location F3, D-9A, D-9B at location D4; D-12A, D-12B at location E4, D-5A, D-5B at location E4, D-6A, D-6B at location F4, D-13, D-14 at location D4; D-15, D-16 at location E4, L-7A at location D5, L-7B at location E5

·□Media for prefilter(s) at location E1; HEPA filters at locations D4, E4, and charcoal absorbers at locations D5, E5 ,

Unit 2 LRA Drawing 2-HVAC-02, Rev. 0.

· □Housings for fans 2HVS-4A and 4B at locations D2, E2; 2HVE-9A, 9B, at locations D5 and E5 ,

·□Housings for dampers: 2L-8 at location E1; unlabeled at locations D2, E2, D-1, D-2, D-3, D-4 at location D3; GD-12 at location E3, D-7B at location F3; unlabeled at location F3 (total 3), D-9A, D-9B at location D4, D-12A, D-12B at location E4, D-13 at location D4, D-15 at location E4; D-14 at location D5, D-16 at location E5, 2L-7A at location D7, 2L-7B at location E7.,

·□Media for prefilter(s) at location E1; HEPA filters at locations D5, E5; and charcoal absorbers at locations D5, E5 ,

If the filter media for the components identified above for Units 1 and 2 were excluded on the basis that these media components are routinely replaced (consumables), describe the plant-specific monitoring program and the specific performance standards and criteria for periodic replacement.

2 3 3 15-8A 7/31/02 ML022130182

LRA Table 3 3-15 exclude the following components and/or housings listed below, although these components and/or housings, support the intended function of the Unit 2 fuel handling building ventilation system. These components are shown on Drawing 2-HVAC-03, Rev 0, as being within the scope of license renewal Include these SCs in LRA Table 3 3-15 subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 21(a)(1) or justify their exclusion

·□Housings for dampers D-29, D-30 at location B2, D-33, D-34 at location C2, D-31, D-32 at location B4; D-35, D-36 at location C4

2.3 3.15-9 7/31/02 ML022130182

LRA Drawing 2-HVAC-01, Rev 0, shows the intake structure exhaust system for Unit 2 to be within the scope of license renewal However, the following system components are not included as part of LRA Table 3 3-15 as being in the scope of license renewal and subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 21(a)(1) or justify their exclusion:

·□Housings for exhaust fans 2HVE-41A, 41B at location F5 ,

·□Housings for two unlabeled pressure damper(s) at (location F5).,

·□Screened openings (not shown on LRA Drawing 2-HVAC-01, Rev. 0) and associated ductwork (as identified in Section 9 4.6 2 of the Unite 2 UFSAR).

Include the above SCs in the scope of the license renewal and subject to an AMR in accordance with the 10 CFR 54 4(a)(2) and 10 CFR 54 21(a)(1) or justify their exclusion.

2 3 3 2 -1 7/31/02 ML022130182

LRA Table 3 3-2 lists the component cooling water system components/commodity groups in the scope of license renewal and subject to an AMR Metal components of the Unit 2 sight glasses are identified as being exposed to two internal environments, "Treated water- other" and "Air/Gas " However, the glass components of the Unit 2 sight glasses are listed as being exposed to "Treated water- other" only Please explain why the glass components of the Unit 2 sight glasses are not also exposed to an "Air/Gas" internal environment

2 3 3 2-3 7/31/02 ML022130182

Section 9 2 2 3 3 of the St. Lucie Unit 1 UFSAR states that the component cooling water pumps and a portion of the system valves are located outdoors and are designed to operate in environments that include torrential rains and hurricane winds As shown on license renewal drawing 1-CCW-01, component cooling pumps 1A, 1B, and 1C, and motor-operated valves MV-14-1, MV-14-2, MV-14-3, and MV-14-4 are located outdoors in the component cooling area The motor housings associated with these components perform a passive intended function by protecting the motors from environmental effects Although 10 CFR 54 21(a) excludes motors from license renewal scope, the statements of consideration (60 FR 22477, May 8, 1995) state that components that perform their intended function without a change in configuration or properties and that cannot be readily monitored for the effects of aging degradation, even if they constitute part of a component that performs an active function, would be subject to consideration for an aging management review Therefore, the motor housings that protect the safety-related components identified above should be subject to an aging management review. Please include those components within the scope of license renewal or justify their exclusion

2 3 3 3-1 7/31/02 ML022130182

Please clarify the intended support function of the Unit 2 demineralized makeup water system that led to your determination that a portion of the piping for this system is in the scope of license renewal Please confirm that the Unit 1 demineralized makeup water system piping does not perform a similar intended function.

2.3 3 4-2 7/31/02 ML022130182

License renewal drawings 1-EDG-01 (locations B4, C4, D4) and 2-EDG-01 (locations B4 and D4), show guard pipes surrounding the two inch diameter fuel oil lines that connect the diesel oil storage tank building with the diesel generator buildings A note is provided that states that the guard pipes are not within the scope of license renewal

However, the staff believes that these guard pipes should be in the scope of license renewal and subject to an AMR for the following reasons·

·□Section 9.5 4 3 of the Unit 1 UFSAR, states that "pumps, tanks and other equipment in the system are designed for seismic Class I service...", "The diesel oil transfer pumps, valves, piping, and restraints as well as the fuel storage tanks are designed to withstand design basis tornado winds of 360 mph coincident with the atmospheric pressure drop of 3 psi in 3 seconds ." and "...both the above ground and underground portions of the lines are protected from design basis tornado missiles in accordance with the requirements of FSAR section 8 5 "

·□Section 9 5 4 3 of the Unit 2 UFSAR, states that the buried piping between the Diesel Oil Storage Tank and the Day Tanks is "encased within a three inch guard pipe The guard pipe is also coated with a corrosion resistant coating and is also cathodically protected "

Based on the UFSAR information provided above, the intended function of the guard pipes is to protect the diesel fuel oil lines from natural phenomena such as seismic events, high winds and tornado missiles Failure of the guard pipes could prevent satisfactory accomplishment of the safety-related diesel generator function, the guard pipes therefore fall under the criteria of 10 CFR 50 54(a)(2). Please revise Table 3 3-4 and license renewal drawings 1-EDG-01 and 2-EDG-01 to show the guard pipes as being in the scope renewal and subject to an AMR, or justify the exclusion of the guard pipes in question.

2.3 3 4-3 7/31/02 ML022130182

In Section 9.5 5 2 of the Unit 2 UFSAR, reference is made to an aftercooler and individual engine pipe manifold which are supplied by a portion of the cooling water system The staff believes that these components perform a pressure boundary intended function and should be listed in Table 3.3-4 as being in the scope renewal and subject to an AMR Please revise Table 3 3-4 to show these components as being in the scope of license renewal and subject to an AMR, or justify their exclusion If Unit 1 has similar components, include them in Table 3 3-4 as well or justify their exclusion.

2.3 3 4-4 7/31/02 ML022130182

With regard to the treatment of the vendor-supplied EDG skid-mounted equipment, the staff's position is that components that perform a passive function and are also long-lived must be subject to an ARM whether they are skid-mounted or not Please provide a P & ID diagram to clearly identify the EDG evaluation boundaries to ensure that all the long-lived components with a passive function on the EDG skid are subject to an AMR. If a component is not subject to an AMR, please provide detailed justifications for its exclusion

2 3 3 5-1 7/31/02 ML022130182

Section 3.8 1.1.5 of the St Lucie Unit 1 UFSAR states that the function of the emergency cooling canal dam is to separate the waters of the emergency cooling source from the intake canal during normal operation and, through valved opening, to provide the shutdown cooling water requirements in the unlikely event the ocean intake becomes unavailable As shown on license renewal drawing 1-ICW-02, safety-related (design class "C") air supply piping leads from butterfly valves SB-37-1 and SB-37-2 (locations B6, B7), through valves V37223 and V37225 (locations A5, A6) to solenoid valves SE-37-1 and SE-37-2 (location A6). A branch of this piping runs to locked closed valves V37226 and V37227 (locations B6, B7) Failure of this piping or valves would open the butterfly valves and let water from Big Mud Creek (via the emergency cooling canal dam) flow into the intake canal during normal operation Please clarify whether failure of this piping and components could degrade or result in the failure of the in-scope emergency cooling canal system to perform its intended function. For example, fouling or blockage could result from entrainment of debris while providing higher-than-design flow during normal operation of the circulating water system

2 3 3.6-1 7/31/02 ML022130182

LRA Section 2.3 3.6 lists sprinkler heads as components requiring an aging management review. Table 3 3-2 identifies the material for sprinkler head components as a copper alloy. Appendix 9.5A of the UFSAR for both units states that the plant fire protection systems for St Lucie have closed head sprinklers Closed head sprinklers have a fusible element which may be subject to aging effects These fusible elements are typically made from a eutectic mixture of metals which may be subject to aging effects Verify that the proper materials were considered for closed head fusible elements in the scoping and screening process and identify the basis for stating they have no aging effects and need not be included in any program/activity.

2 3.3 6-2 7/31/02 ML022130182

Appendix 9 5A of the UFSAR for each unit identifies fire detection devices including fixed temperature detectors LRA Section 2 3 3 6 states that fire detection is included in the electrical/I&C screening LRA Table 2 5-1 lists alarm units including fire detectors as a commodity group and also sensors as a commodity group, however, the text of Section 2.5.4 addresses only cables and connectors not included in the Environmental Qualifications Program as needing aging management review. Non-restorable thermal detectors may be subject to aging effects which could prohibit them from performing their intended function. If any thermal detectors are non-restorable and therefore not testable, provide the basis for screening them out of an aging management program. (See NFPA 72, National Fire Alarm Code for requirements for testing of non-restorable thermal devices)

2 3 3 6-3 7/31/02 ML022130182

Table 3.3-6 includes nozzles which are part of pressure boundaries, which would be assumed to be closed sprinkler heads Some nozzles are not closed, such as deluge system nozzles and Halon 1301 nozzles Verify that these open head nozzles are within the scope of the LRA

2.3 3 7-1 7/31/02 ML022130182

Section 9 1.3 2 of the St. Lucie Unit 1 Updated Final Safety Analysis Report (UFSAR), and 9 1.3 2.1 of the St Lucie Unit 2 UFSAR, state that the cooled fuel pool water is returned to the bottom of the fuel pool via a distribution header. In locations G4 of drawing 1-SFP-01 and H4 of drawing 2-SFP-01, the distribution header (or sparger) is shown to be within the scope of license renewal However, LRA Table 3 3 7 does not identify this component as being in the scope of license renewal and subject to an AMR This distribution header is both passive and long-lived, therefore the staff believes that this component should be subject to an AMR. Please revise Table 3 3-7 to show this component as being in the scope renewal and subject to an AMR, or justify its exclusion

2.3 3 9-2 7/31/02 ML0022130182

Two interconnections to the circulating water pumps are shown on license renewal drawings 1-ICW-01 at locations F5 and F7 for Unit 1. The license renewal boundaries between the in-scope intake water system and the out-of-scope circulating water system are at orifices SO-21-5A and SO-21-5B and do not form a closed pressure boundary. Please justify these open license renewal boundaries.

2 3 3.9-3 7/31/02 ML022130182

License renewal drawings 1-ICW-01 and 2-ICW-01 show valves I-MV-21-2 and 3 at locations F4 and H4. These valves isolate the portion of the intake cooling water system that is in the scope of license renewal from the turbine cooling water heat exchangers and the steam generator open blowdown cooling system heat exchangers that are not within the scope of license renewal. Section 9 2 1.3 4 of the St Lucie Unit 1 UFSAR states, "Isolation valves I-MV-21-2 and 3 are powered by motor operators with weatherproof enclosures and are thus suitable for outdoor service The valves are located in the valve pit adjacent to the pump structure .."

Based on this description provided in the UFSAR, the staff believes that these enclosures should be included in the scope of license renewal and be subject to an AMR However, waterproof valve operator enclosures are not listed in Table 3 3-9 As such, the staff is unable to verify that these valve operator enclosures have been included in the scope of license renewal. Please identify the components/component groups which comprises these components or justify their exclusion

2 3 3.9-4 7/31/02 ML022130182

GDC 44, "Cooling Water," requires, in part, that suitable redundancy in features for cooling water systems be provided GDC 2, "Design Bases for Protection Against Natural Phenomena," requires, in part, that SSCs important to safety be designed to withstand the effects of natural phenomena without loss of capability to perform their safety function. Regulatory position C 2 of Regulatory Guide 1.27 requires that the ultimate heat sink should be capable of withstanding the most severe natural phenomena expected at the site, or a single failure of manmade structural features

As shown in license renewal drawings 1-ICW-01 and 2-ICW-01at locations A6-A7 for both St. Lucie units, the intake cooling water discharges into the discharge canal through twin 30 inch lines The UFSAR for Unit 1, Section 9 2 7.3 states that to preclude blockage of the discharge canal flow (by soil liquefaction), the discharge piping was designed with an open stand pipe (elevation +13 75 ft) which will discharge water above the liquefaction level However, the staff was unable to determine, with a reasonable assurance, that these stand pipes were in the scope of license renewal and subject to an AMR based on the information presented in Table 3 3-9 and license renewal drawings 1-ICW-01 and 2-ICW-01. Please verify that the stand pipes are in the scope of license renewal and subject to an AMR for both St Lucie units, or justify their exclusion

2 3 3 9-6 7/31/02 ML022130182

License renewal drawing 1-ICW-01 shows valves I-MV-21-2 and 3 at locations F4 and H4. These valves isolate the portion of the intake cooling water system that is in the scope of license renewal from the turbine cooling water heat exchangers and the steam generator open blowdown cooling system heat exchangers that are not within the scope of license renewal Section 9 2.1 3 4 of the St Lucie Unit 1 UFSAR states, "Isolation valves I-MV-21-2 and 3 are powered by motor operators with weatherproof enclosures and are thus suitable for outdoor service The valves are located in the valve pit adjacent to the pump structure. ."

Section 9 2.13 3 of the St Lucie Unit 1 UFSAR states that the intake cooling water system pumps and valves are located outdoors and are designed to operate in environments that include torrential rains and hurricane winds In addition, Section 9 2.1 3.4 of the St Lucie Unit 1 UFSAR states, "Isolation valves I-MV-21-2 and 3 are powered by motor operators with weatherproof enclosures and are thus suitable for outdoor service. As shown on license renewal drawing 1-ICW-01, the motors for intake cooling pumps 1A, 1B, and 1C, and motor-operated valves I-MV-21-2 and I-MV-21-3 are located outdoors on the intake structure. The motor housings associated with these components perform a passive intended function by protecting the motors from environmental effects Although 10 CFR 54 21(a) excludes motors from license renewal scope, the statements of consideration (60 FR 22477, May 8, 1995) state that components that perform their intended function without a change in configuration or properties and that cannot be readily monitored for the effects of aging degradation, even if they constitute part of a component that performs an active function, would be subject to consideration for an aging management review Therefore, the motor housings that protect the safety-related components identified above should be subject to an aging management review. Please include those components within the scope of license renewal or justify their exclusion

2 3 4.1-2 7/31/02 ML022130182

Section 10 3 1 of the Unit 1 UFSAR and Section 10.3 3 of the Unit 2 UFSAR state that the main steam isolation valves (MSIV) and their actuation system components (i e , solenoid valves, air accumulators and control devices) are required to perform an isolation function. The MSIV air accumulators have not been included in Table 3 4-1 of the license renewal application as being in the scope of license review and subject to an AMR. [Note The MSIV air accumulators are shown at locations A2, A3, A6, and A7 of drawing 1-IA-05, and at locations D2 and H2 of drawing 2-MS-03] Accumulators are included with the instrument air system in Table 3 3-8; however, it is not clear whether that component group includes the MSIV accumulators. Please confirm that the MSIV air accumulators have been included in the LRA as being in the scope of license renewal and subject to an AMR, or justify their exclusion

2.3 4 2-1 7/31/02 ML022130182

In location B5-6 of drawing 2-EDG-02, at the blowdown lines of steam generator 2A, cooling fins [CF-2A2 and CF-2A1] are shown to be within the scope of license renewal However, these cooling fins are not identified in Table 3 4-2, which lists the components of the main feedwater and steam generator blowdown system that are in the scope of license renewal and subject to an AMR Please include these cooling fins and their intended function in Table 3 4-2, or justify their exclusion

Cooling fins are not depicted on the blowdown line from steam generator 2B, nor are they depicted on the blowdown lines for the Unit 1 steam generators. Section 10 4.8 2 of the Unit 2 UFSAR does not describe these cooling fins nor their intended function. Please confirm that cooling fins do not exist on other steam generator blowdown lines

2.3 4.3-2 7/31/02 ML022130182

The LRA identified vortex breakers in Table 3 4-3 as being in the scope of license renewal and subject to an AMR; however, the drawing legend sheet does not identify the symbol for vortex breakers Therefore, these components could not be located on the various drawings Please identify the drawing and location of the vortex breakers and confirm that these components are in the scope of license renewal

2 3 4 3-3 7/31/02 ML022130182

LRA Table 3 4-3 identifies an auxiliary feedwater lube oil tank, pump and cooler that supplies lubricating oil to the Unit 2 turbine driven auxiliary feedwater pump However, these components could not be located on drawings 2-AFW-01 and 2-AFW-02 referenced in LRA Table 2 3-4 as showing the components of the auxiliary feedwater system Please identify the drawing and location of these components and confirm that these components are in the scope of license renewal

2 4 1.1.1-1* became RAI 2 4.1-1

A manway is shown on the top of the steel containment structure at location B5 on general arrangement drawings 8770-G-067 (Unit 1 UFSAR, Figure 1.2-10) and 2998-G-067 (Unit 2 UFSAR, Figure 1 2-10) However, this manway and associated closure bolting and gaskets are not listed in LRA Table 3.5-2. These components appear to form a portion of the containment pressure boundary. Justify why these components are not within the scope of license renewal and subject to an aging management review.

2 4 1.1.1-2* became RAI 2 4 1-2

Table 3 5-2 (page 3 5-44) and Sections 3 5 1 4 and 3.5 1.4.1 and UFSAR figures 1.2-10 locations K1, K10, and I15 Please clarify whether Ethafoam components are considered part of the elastomers listed in the table and are within scope If not, provide justification for excluding the Ethafoam components

2 4 1.1 2-1 6/21/02ML021780147

Containment and shield building penetrations are shown on the license renewal drawings of multiple systems and discussed in several LRA sections (including mechanical penetrations, containment cooling, containment spray, containment isolation, safety injection, CVCS, component cooling water, instrument air, sampling, ventilation, main steam, feedwater, auxiliary feedwater). Because of the large number of license renewal drawings and LRA sections that discuss penetrations, the staff is unable to determine with a reasonable assurance that all of the containment and shield building penetrations shown in FSAR Table 6 2-16 (for Unit 1) and Table 6 2-52 (for Unit 2) are within the scope of license renewal Verify that all containment and shield building penetrations are within the scope of license renewal and subject to an AMR, or identify and justify the exclusions

Resolution. The information requested by the staff is available on page 2 3-11 of the LRA. On page 2 3-11 of the LRA, the applicant states that "all containment penetrations and associated containment isolation valves and components that ensure containment integrity, regardless of where they are described, require an aging management review "

2 4.1.1.2-1* 6/21/02ML021780147

The staff is unable to determine with reasonable assurance that all of the containment and shield building penetrations shoun in UFSAR Table 6 2-16 (for Unit 1) and Table 6 2-52 (for Unit 2) are within the scope of license renewal Verify all penetrations are within scope or identify and justify the exclusions

2 4 1.1.4-1* became 2 3 2-2

The staff believes that the escape hatches and the construction hatch listed as being in scope and subject to an AMR in Section 3 5 1.1 and Table 3 5-2, should be identified in the either Section 2 4.1.1.4 or elsewhere in Section 2

2.4 1.1.5-1 6/21/02ML021780147

General arrangement drawing 8770-G-065 (Unit 1 FSAR Figure 1.2-8) shows that the fuel transfer tube is shielded with lead shot (at location C15) Lead shielding is also shown in the vicinity of the refueling cavity in general arrangement drawing 2998-G-065 (Unit 2 FSAR Figure 1 2-8) at location C16 However, none of the component/commodity groups listed in LRA Table 3 5-2 identify components composed of lead or lead shot materials These shielding components made of lead and lead shot materials may have a safety-related intended function and if so should be in the scope of license renewal and subject to an AMR. Please include these components in Table 3 5-2, or justify their exclusion

Resolution: The information requested by the staff is available in the UFSARs In Section 12 3.1.5 of the Unit 1 UFSAR and Section 12.3 1.6 of the Unit 2 UFSAR, the licensee identifies the lead shielding as being installed for the purpose of personnel protection.

2.4 1.1 5-1* 6/21/02ML021780147

The staff believes that the lead shot used for shielding have a safety-related function and should be within scope.

2.4.1.2-1* Became 2 4.1-4

The staff believes that the fill concrete provides structural support to the containment vessel and should be within scope and subject to an AMR If not justify its exclusion

2 4.1-1 6/21/02ML021780147

The diagrams of the Containment Cooling System are not detailed enough for the staff to determe the system boundaries Please provide more detailed drawings and/or additional references to supplement these drawings. Example: Drawings do not show whether duct riser and ring header are within scope

2 4 2 - 1 2 4 1.3-2 / 2 4 1-6

The staff believes that the failure of the vent stacks a) could potentially damage safety-related SSCs that have a spacial relationship with the vent stackand b) could prevent the satisfactory function of the safety-related radiation monitors and the shield building ventilation system Revise the LRA or justify the exclusion of the vent stacks

2 4 2.10-1 7/31/02 ML022130182

Section 3 8 4 1.5 of the Unit 2 UFSAR states "The intake cooling water pumps are protected from tornado missiles by an enclosure consisting of reinforced concrete walls and structural steel roof extending above the deck to elevation 36 5 ft A similar structure for missile protection is provided over a portion of the valve pit " However, structural steel roofing is not listed as a component/commodity group in Table 3 5-11, which lists the intake structure components in the scope of license renewal and subject to an AMR Table 3 5-11 does list a miscellaneous steel component/commodity group, however roofing is not listed as a use of this component as was done for the reinforced concrete component/commodity group Please clarify whether the miscellaneous steel commodity group includes roofing If the steel roofing is not in the scope of license renewal and subject to an AMR, justify its exclusion

2.4 2.10-2 7/31/02 ML022130182

The Unit 1 UFSAR Section 3.8 1.1.4 states that "The structure is designed to withstand seismic, tornado, missile and hurricane loadings and flooding". Flood protection is not listed in Section 2 4.2 10 of the LRA as one of the attributes of the intake structures. In addition, none of the components/commodity groups listed in Table 3 5-11 is credited with the intended function of flood protection. Justify why flood protection is not required

2 4 2.1-1 7/31/02 ML0222130182

License renewal drawing 2-FP-01 (at locations H4, H5) highlights all of the components in the flow path from the yard sump to the component cooling area sump for Unit 2. However, the component cooling area sump is not listed in Table 3 5-3, which identifies the components of the component cooling area that are in the scope of license renewal and subject to an AMR Justify its exclusion

2.4 2.11-1 7/31/02 ML022130182

Section 3 4 of the Unit 2 UFSAR describes stop logs provided for the reactor auxiliary building openings The UFSAR states "These aluminum stop logs would be stacked to Elevation 22 0 feet and secured with bolts ... The stop logs are stored onsite in a manner that reserves their readiness for use When a hurricane watch is posted for the plant, the stop logs are removed from storage and prepared for installation, with actual installation occurring when the hurricane warning is posted for the plant " However, LRA Table 3 5-12, which lists the components of the reactor auxiliary building that are in the scope of license renewal and subject to an AMR, does not list aluminum stop logs or bolts. Please identify the LRA table where these components, which should be credited with the intended function of protection against floods and high winds are listed, or justify their exclusion.

2 4 2.12-1 7/31/02 ML022130182

Section 2.4.2.12 of the LRA describes the steam trestle areas. It states that "Each Steam Trestle Area consists of two braced steel tower structures that contain safety-related components from the Main Steam, Feedwater and Auxiliary Feedwater Systems". The steam trestle area for Unit 1 is described in Appendix 3C of the UFSAR. On page 3C-1 it is stated that "The only other safety related components in the area are the three auxiliary feedwater pumps and motors which are located under the trestles." On page 3C-4 it is stated that " There is no danger that a rupture of a steam line or feedwater line could cause a loss of function of more than one auxiliary pump due to flooding Each of the three pumps are provided with a flood wall around them to elevation +22 ft."

A list of steam trestle areas structural components requiring an aging management review and the component intended functions is provided in Table 3 5-13 In the component/Commodity Group, reinforced concrete above and below groundwater is listed along with the intended functions However, flood protection is not included as an intended function in Table 3.5-13 Justify its exclusion.

2 4 2 13-1 7/31/02 ML022130182

Section 2 4 2.13 of the LRA describes the turbine buildings. It states that "Both Turbine Buildings have safety-related piping buried beneath the ground floor slab". A list of turbine building components/commodity groups within the scope of license renewal is provided in Table 3 5-14. The safety-related piping buried beneath the ground floor slab is not included in Table 3 5-14 Justify its exclusion

2.4 2 15-1 6/21/02ML021780147

LRA Section 2.4 2.15 states: "The Yard Structures are described in Unit 1 FSAR Sections 2 4 5 3.2 and 8 3.1.1.9." However, there is no Section 2 4 5 3 2 in the FSAR for Unit 1. There exists a FSAR Section 2 4 5 3, "Surge Sources," Section 2 4 5 3 discusses assumptions for the probable maximum hurricane and does not discuss yard structures Provide the correct reference for this section of the LRA

Resolution The information requested by the staff is available in these UFSAR sections. In Section 2.4.5 7 of the UFSAR for Unit 1 and Section 2 4 5.3 2 of the UFSAR for Unit 2, the applicant states that there is no need to provide stop log flood protection for any safety related structures

2.4 2.15-1* 6/21/02ML021780147

Reference is made to Unit 1, UFSAR Section 2.4 5.3 2 There exists a Section 2 4 5 3 but no Section 2.4 5 3.2 Provide the correct reference for this section of the LRA.

2 4 2.15-2 7/31/02 ML022130182

License renewal drawing 2-FP-01 (at locations H4, H5) highlights all of the components in the flow path from the yard sump to the component cooling sump for Unit 2. Yard sump pump 2A is listed in Table 3 3-13 as an in-scope component of the service water system However, the yard sump is not listed in Table 3 3-13 or in Table 3.5-16, which identifies yard structures that are in the scope of license renewal and subject to an AMR Justify its exclusion

2.4 2 2-1 7/31/02 ML022130182

The condensate polisher building is discussed in LRA Section 2 4.2.2. There is only one condensate polisher building because the condensate polisher filter demineralizer system is shared by both units (as stated in Unit 1 UFSAR Section 1.2-6, page 1.2-23, and Unit 2 UFSAR Section 1.2-4, page 1 2-14) LRA Section 2 4 2 2 references the Unit 1 UFSAR Appendix 9.5A, Section 4, as the description for this building. However, the description provided in Section 4 only identifies the fire areas in this building.

The staff is therefore unable to determine, with a reasonable assurance, that all components/commodity groups of the condensate polisher building within the scope of license renewal have been identified in LRA Table 3 5-4 Please describe this structure and its components, or provide a reference that describes the condensate polisher building.

2 4.2 3-1 7/31/02 ML022130182

Section 2 4 2 3 of the LRA states that "The steel condensate storage tanks are bolted to reinforced concrete ring wall pedestals that are supported on the base mats The tank bottoms are supported on Class 1 structural fill that is enclosed within the concrete ring walls " A list of condensate storage tank enclosure components/commodity groups within the scope of license renewal is provided in LRA Table 3 5-5. The only concrete listed in this table is "Reinforced concrete above groundwater". Bolts, base mats and structural fills are not identified in Table 3 5-5 Justify their exclusion.

2 4 2 5-1 7/31/02 ML022130182

LRA Section 2 4 2.5 states that the emergency diesel generator buildings are in the scope of license renewal because, among the many functions, they provide flood protection barriers In Table 3 5-7, the intended function of flood protection barriers is assigned to (a) reinforced concrete above ground, and (b) missile protection doors

In regards to reinforced concrete, trenches are included in Table 3.5-7 as one of the means of flood protection However, curbs are not included in Table 3 5-7. Such curbs are shown for Unit 2 in General Arrangement Drawing 2998-G-077 at locations (16,F) and (18,F) Please indicate whether the function of these curbs is flood protection in which case they should be included in Table 3 5-7.

In regards to missile protection doors, these are shown for Unit 2 in General Arrangement Drawing 2998-G-077 at locations (18,K) and (18,E) as well as (16,K) and (16,E). Please explain how they function for flood protection. Any special features of these doors that serve for flood protection, (such as gaskets) should be listed in Table 3 5-7.

2 4 2.9-1 7/31/02 ML022130182

Section 2 4 2.9 of the LRA states that the emergency cooling canal and the portion of the intake canal between the emergency cooling canal and the intake structure are within the scope of license renewal As seen in Figure 2 2-1 of the LRA, the boundary of the intake canal in scope is not clearly defined. Highlight the portion of the intake canal that is in scope Explain whether failure of the portion of the intake canal not in scope could affect the minimum cell level of the intake structure when taking water from the emergency cooling water canal.

2 4.6-3 7/31/02 ML022130182

LRA Section 2.4 2 6 discusses fire barriers that provide compartmentalization and containment Page 9.5A-204 (Exemption E5) of the UFSAR discusses six general types of piping penetrations that have are not rated, yet serve to provide fire separation. Page 9 5A-205 (Exemption E6) of the UFSAR discusses that thickness of steel in the piping (48-inch standard wall pipes and 2-inch schedule 50 pipes) provides protection from fire damage Degradation of piping penentration assemblies or piping wall thickness due to aging may invalidate these exemptions Page 9.5A-177, (Exemption C2) of the UFSAR discusses a 1/4 in minimum steel hatch cover which provides fire resistance between fire areas. Degradation of this hatch cover may invalidate this exemption

3.1 1.1-1 7/31/02 ML022130182

The Standard Review Plan for License Renewal (SRP-LR) outlines in section 3 1.3 2.4, "Crack Initiation and Growth due to Thermal and Mechanical Loading or Stress Corrosion Cracking", that a one time inspection for internal surfaces of the piping for the management of crack initiation and growth due to mechanical loading of small-bore reactor coolant system and connected system piping (<NPS 4) should be augmented by verifying that the service-induced weld cracking is not occurring in the small-bore piping, including pipe, fittings, and branch connections. While Section 3 1.1.1.2 of the LRA addresses one-time Small Bore Class 1 Piping Inspection, there is no mention of inspection for service induced weld cracking within that section or in the AMP for Small Bore Class 1 Piping Inspection. Discuss how the AMP intends to include inspection for weld cracking including (a) determination of the sample size based on an assessment of materials of fabrication, environment, cracking due to mechanical (service) loading, and operating experience, (b) identification of the inspection locations in the system or component based on mechanical (service) loading, (c) determination of the examination technique, including acceptance criteria that would be effective in managing mechanical (service) loading for which the component is examined

3 1.1.1-2 7/31/02 ML022130182

The License Renewal Application indicates in Section 3.1.1 1.2, pg 3 1-4 that reduction in fracture toughness of Cast Austenitic Stainless Steel (CASS) for piping, fittings, and safe ends requires management through Thermal Aging Embrittlement of CASS program No information was provided on the safety valve flanges or closure flanges Please indicate whether these are CASS materials and if they are intended to be covered by any management program

3 1.2-1 7/31/02 ML022130182

The pressurizer lower head cladding weld material was identified in the LRA as INCO 182/82 but did not list that material in Section 3 1.2.1 Materials and Environments. Identify all RCS components and subcomponents that are fabricated from weld metal using INCO 182/82, and are exposed to primary water. Describe the aging management programs used to manage the cracking due to stress corrosion cracking (SCC), in particular primary water SCC (PWSCC), in these items during the license renewal period, or provide the basis for not requiring management of this aging effect

3 1 2-2 7/31/02 ML022130182

In order to support the conclusion in WCAP-14574 that SCC would not be a problem in welded Type 304 stainless steel pressurizer supports, if a reasonable justification could be made that the associated welds were not in the sensitized state, describe how the implementation of St Lucie or FPL plant-specific procedures and quality assurance criteria for the welding and testing of austenitic welds, if any, provides a reasonable assurance that sensitization has not occurred in these welds

3 1 2-3 7/31/02 ML022130182

Propose an AMP to verify whether thermal fatigue-induced cracking in the pressurizer cladding has propagated through the clad into the ferritic base metal or weld metal materials beneath the clad.

3 1.6-4 7/31/02 ML022130182

As shown on page 3.1-70 of the LRA, the applicant will use the ASME Section XI inservice inspection program as the aging management program to manage loss of mechanical closure integrity of the bolting in the primary and secondary manways and secondary handholds. Is ASME Section XI adequate, if so, provide basis, or, is there a bolting integrity program for St Lucie?

3 1 6-5 7/31/02 ML022130182

In Sections 3.1 6 2.1 and 3 1 6 2 2 of the LRA, the applicant stated that the inspection program performed in accordance with the ASME Code, Section XI, IWB, IWC, and IWD will provide assurance that cracking and wear in Alloy 600 tubing that are managed The steam generator tubes are a part of the primary system pressure boundary; therefore, they must satisfy the ASME Code, Section XI However, in practice, licensees use EPRI steam generator examination guidelines, NEI 97-06, and plant technical specifications in the steam generator tube inspection. In addition to the ASME Code, the applicant should discuss its steam generator tube inspection program in the context of the EPRI steam generator examination guidelines, NEI-97-06, the NRC regulations and guidance, and the St Lucie technical specifications

3 1 6-6 7/31/02 ML022130182

In Section 3 1.6 2 1, page 3 1-33, the applicant did not discuss cracking in Alloy 690 tubing, presumably because cracking has not been detected in Alloy 690 tubes in the domestic steam generators However, there is no evidence to suggest that Alloy 690 tubing would be exempt from cracking in the future. The applicant should describe the potential aging effects and associated aging management program for Alloy 690 tubing in unit 1 steam generators In addition, the applicant needs to describe its inspection program for Alloy 690 tubing if cracking were detected in Alloy 690 tubing in the future

3 3 1 - 1 6/21/02ML021780147

In Table 3 3-1 on chemical volume and control system (CVCS) of the LRA treated water (other) is listed as an environment that may give rise to aging effects In Appendix C (C-7) of the LRA chemical volume and control is not included as a system that has the treated water (other) as an applicable environment. Please explain the difference.

Resolution The information requested by the staff is available in Table 3 3-1 and Appendix C of the LRA. In Table 3 3-1 of the LRA, the applicant identifies the letdown heat exchanger as being exposed to treated water (other) and treated water (borated). In Appendix C of the LRA, the applicant identifies the CVCS system as being exposed to treated water (borated) In
Table 3 3-1 the applicant discusses a component and in Appendix C the applicant discusses a system.

3 3 1 - 1* 6/21/02 ML021780147

In Table 3.3-1 on Chemical Volume and Control of the LRA treated water(other) is listed as an environment that may give rise to aging effects In Appendix C (C-7) of the LRA Chemical Volume and Control is not included as a system that has the treated water (other) as an applicable environment Please explain the difference

3 3 1 - 10 Sent to AMP Reviewer

From what locations in the fuel oil components (e g , fuel oil tank bottoms?) are fuel oil samples obtained during periodic sampling? Corrosion may occur at locations in which contaminants may accumulate, such as a tank bottom, and an ultrasonic thickness measurement of the tank bottom surface ensures that significant degradation is not occurring Is thickness measurement of the tank bottom used to detect aging effects?

3 3.1 - 11 Sent to AMP Reviewer

Are the acceptance criteria for the chemistry parameters required to be monitored and controlled as listed in the St. Lucie Units 1 and 2 Technical Specifications consistent with applicable ASTM Standards?

3 3 1 - 12 Sent to AMP Reviewer

The applicant stated that operating experience at St Lucie Nuclear Plant has included particulate contamination due to a contaminated tanker truck transfer pump and hose Specify what aging degradation, if any has resulted and what corrective action has been taken? The applicant also stated that no instances of fuel oil system component failures attributed to contamination have been identified. Specify, if any, operating experience on age-related degradation and corrective actions taken prior to age related failures of the fuel oil system components

3 3 1 - 13 Sent to AMP Reviewer

Describe more specifically how operating experience provide basis for preventive measures including charging pump block internal inspection (Unit 2 only), oil sampling and water removal, and replacement of specific structural components and component groups based on operating experience In particular does operating experience include age-related degradation and/or failures and corrective action taken that may provide guidelines and lessons learned for preventive measures? Please see also RAI 3 3 1-12 on the attribute 'Operating Experience and Demonstration'.

3 3 1 - 14 Sent to AMP Reviewer

The applicant stated that certain Intake Cooling Water components are replaced on a given frequency based on operating experience. Describe more specifically how operating experience provide basis for frequency determination. In particular does operating experience include age-related degradation and/or failures and corrective action taken that may provide guidelines and lessons learned for frequency determination? Please see also the RAI 3 3 1-12 on the attribute 'Operating Experience and Demonstration'.

3.3 10-1* 6/19/02ML021780091

Corrosion of carbon steel component could occur at low points of the system due to moisture condensation, especially for the carbon dioxide subsystem in the presence of moisture Is the miscellaneous bulk gas supply system examined for condensation at low points of the distribution system? if yes, please provide specifics of the inspection/examination procedures. If not, please provide the justification for not monitoring condensation in the system.

3 3 10-2 Sent to AMP Reviewer

What are the inspection technique and inspection intervals in the Systems and Structures Monitoring Program for aging management of the affected components of the miscellaneous bulk gas supply?

3 3.10-3 Sent to AMP Reviewer

Describe the plant operating experience in the miscellaneous bulk gas supply covered by the Systems and Structures Monitoring Program in terms of aging degradation found and corrective actions taken

3 3.11 - 10 Combined in 3.3 11-1

The LRA stated that the average humidity in containment air environment is 73%. What is the bounding humidity level one can expect in a containment air environment at the plant? Discuss the operating experience, if any on age-related degradation and corrective action taken for any of these components in containment air prior to age-related failures

3 3 11 - 10 6/19/02ML021780091

Basing on RAI 3 3.11-1 and pending on the response of the applicant if hardening is a possible aging degradation of the rubber expansion joints (Unit 2 only) then is the Systems and Structures Monitoring Program the applicable AMP?

3.3 11 - 12 Became 3 3.11-2

If some aging effects (such as loss of materials) requiring aging management is applicable to the embedded/encased piping/fitting components of the Primary Makeup Water system then what are the applicable AMP(s)?

3 3 11 - 13 Sent to AMP Reviewer

Embedded/encased carbon steel piping/fitting is closely similar to the embedded steel structural element included by the applicant in terms of applicable aging effects Does embedded/encased carbon steel piping/fitting have similar aging effects and require similar aging management as embedded steel?

3 3 11 - 14 Sent to AMP Reviewer

Are these AMP(s) (such as the ASME Section XI, Subsection IWE Inservice Inspection Program and the Systems and Structures Monitoring Program) applicable to aging management for non-structural components such as embedded/encased stainless steel piping/fitting that are inaccessible?.

3 3.11 - 15 Sent to AMP Reviewer

Please provide more specifics on this indirect aging management methodology for the case of managing aging of embedded/encased stainless steel piping/fitting What is the analogous aging process, component, materials and environment used for comparative evaluation? Please provide the basis for the reliability and adequacy of this type of evaluation by analogy Have more direct but still remote monitoring/inspection techniques been considered such as those that involve direct probing of the external surfaces of the concrete via electrical measurements which will provide information on the corroding versus non-corroding regions of the concrete interior? If these and related direct techniques are not applicable to aging management of embedded/encased stainless steel piping/fitting please provide the basis

3 3 11 - 2* became 3 3 11-2

What is the composition of the internal air/gas environment that the fittings and nozzles of the hose station of Unit 2 is exposed to? What is the level of humidity of this particular environment? Is loss of materials an applicable aging effect? If so, what is the applicable AMP? If not, please provide the basis.

3 3 11 - 3 became RAI 2 4 1-1

What are the differences between outdoor and outdoor (ECCS pipe tunnel) environments? Which aspects of these differences lead to differences in applicable aging effects for stainless steel components for the primary water makeup system in these two environments

3.3.11 - 4 became RAI 3 3-1

The outdoor environment at St. Lucie contains moist, salt-laden atmospheric air, with temperature at 27 F-93 F, 73% average humidity, and exposure to weather, including precipitation and wind. Therefore the outdoors environment also contains chlorides and moisture Evaporation/condensation may result in high concentration of chlorides in localized regions of the surfaces of the steel components This may lead to attacks and disruption of the protective film formed on the surfaces of the stainless steel Once some particular region of the protective film is destroyed localized corrosion of the steel begins through an electrochemical process Corrosion through a similar chloride-based process is also applicable for carbon steel components The applicable aging effects are loss of materials and loss of mechanical closure integrity. The applicant has stated that no aging effects for SS components and CS bolting in the Primary Water Makeup system associated with exposure to an outdoor environment are identified in Table 3.3-11. Has the applicant considered the corrosion of stainless steel components and CS bolting through the process described above? If this aging process and its associated aging effects are not applicable to St Lucie please provide the justification.

3 3.11-1* Became 3 3 11-1

Is hardening an applicable aging effect for the rubber materials of the expansion joints in the Primary Makeup Water System? If so, how is this aging effect managed? If not, please provide the basis

3 3 11-12 became draf3 3.11-12

Basing on RAI 3.3.11-10 and 11 and pending the responses of the applicant, if some aging effects (such as loss of materials) requiring aging management is applicable to the copper alloy components of the Primary Makeup Water system in the containment air and indoor-not air conditioned environments then what are the applicable AMP(s)?

3 3 11-4 6/19/02ML021780091

The outdoor environment at St Lucie contains moist, salt-laden atmospheric air, with temperature at 27°F-93°F, 73% average humidity, and exposure to weather, including precipitation and wind. Therefore, the outdoors environment also contains chlorides and moisture Evaporation/condensation may result in high concentration of chlorides in localized regions of the surfaces of the steel components This may lead to attacks and disruption of the protective film formed on the surfaces of the stainless steel Once some particular region of the protective film is destroyed localized corrosion of the steel begins through an electrochemical process. Corrosion through a similar chloride-based process is also applicable for carbon steel components The applicable aging effects are loss of materials and loss of mechanical closure integrity The applicant has stated that no aging effects for SS components and CS bolting in the primary makeup water system associated with exposure to an outdoor environment are identified in Table 3.3-11.

3 3 1-15 Sent to AMP Reviewer

The applicant stated that Diesel generator fuel oil storage tanks are checked for water, and feedwater isolation valve hydraulic accumulators are sampled to detect water in the oil on a periodic basis How is the periodic basis determined and justified? If operating experience is one of the factors, please see also RAI 3.3 1-14

3 3 11-5 6/21/02ML021780147

This RAI and the three following ones are similar to RAI 3 3 5-1, 2, and 3 but with specific references to components in the primary makeup water system In Table 3 3-11 what is the environment to which the concrete with embedded/encased SS piping/fitting is exposed? Is that environment raw water-salt water, outdoor air, or some others? The raw water-salt water environment contains chlorides Outdoor environment is defined in the St. Lucie LRA as moist, salt-laden atmospheric air, with temperature at 27°F-93°F, 73% average humidity, and exposure to weather, including precipitation and wind Therefore, the outdoors environment also contains chlorides These chlorides will reach the steel/concrete interface in the interior of the concrete through the process of permeation/infiltration through the pores of the concrete. Accumulation of high enough levels of chlorides will result in attacks and disruption of the protective film formed on the surfaces of the steel due to the originally high pH levels in the concrete environment Once some particular region of the protective film is destroyed localized corrosion of the steel begins through an electrochemical process The applicant has stated that no aging effects for components in the primary makeup water system associated with external exposure to an embedded/encased environment are identified in Table 3 3-11.

Has the applicant considered the corrosion of embedded/encased steel through the process described above? If this aging process is not applicable to St Lucie please provide the justification. The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect

3.3 1-16 Sent to AMP Reviewer

The applicant stated that the aging effects of concern will be detected by visual inspection of surfaces for evidence of corrosion, cracking, leakage, debris, and deterioration What types of visual inspection are to be conducted (VT-1 etc ?)?

3 3 11-6 became RAI 3 3-3,4,5

Has the applicant considered the corrosion of embedded/encased steel through the carbonation process (which is unrelated to chloride ions) described above? If this aging process is not applicable to St. Lucie please provide the justification

3.3 11-6 6/21/02ML021780147

If the concrete structure is only exposed to atmospheric air with negligible levels of chlorides, the embedded/encased steel piping/fittings may still be susceptible to a corrosion process due to the carbon dioxide present in the atmospheric air This corrosion process operates via the generation of carbonic acid which reduces the pH level in the vicinity of the steel/concrete interface This neutralization process in turn disrupts the passivity of the protective films and permits the attack on the underlying steel substrate The water/cement ratio of the concrete is an important factor in affecting the rate of this corrosion process

Has the applicant considered the corrosion of embedded/encased steel through the carbonation process (which is unrelated to chloride ions) described above? If this aging process is not applicable to St. Lucie please provide the justification The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect

3 3 11-7 6/21/02ML021780147

In Section 3 5 2 3 2 of the LRA, the applicant stated that aggressive chemical attack, leading to corrosion of reinforcing steel and embedded steel, was identified as an age-related degradation mechanism for concrete structural components At St Lucie Units 1 and 2, this is applicable to concrete structural components exposed to the groundwater, salt water flow, or salt water splash (Intake Cooling Water System discharge). The applicant described the structures with concrete structural components located below groundwater elevation as including the intake structures, the intake, discharge, and primary makeup waters, the reactor auxiliary buildings, and the steam trestle areas The intake structures and the intake, discharge, and primary makeup waters concrete structural components are also exposed to high chlorides due to the flow of salt water Based on the above, the applicant concluded that loss of material due to aggressive chemical attack leading to corrosion of reinforcing and embedded steel is an aging effect that requires aging management for concrete structural components below groundwater elevation, exposed to salt water flow, or exposed to salt water splash.

Does the above description include the process of infiltration/permeation of salt-laden water or air through the porosity of the concrete to the steel/concrete interfaces in the concrete interior? If so, please refer to RAI 3 3.11-5 and 3 3 11-6 and provide the basis for not including aging effect requiring aging management for embedded/encased stainless steel piping/fitting in Table 3 3-11 of the LRA If not, provide the basis for excluding permeation/infiltration of salt-laden water or air as an applicable aging process

3 3.11-7 became RAI 3.3-3,4,5

Does the above description include the process of infiltration/permeation of salt-laden water or air through the porosity of the concrete to the steel/concrete interfaces in the concrete interior? If so, please refer to RAI 3 3.11-5 and 3.3.11-6 and provide the basis for not including aging effect requiring aging management for embedded/encased stainless steel piping/fitting in Table 3 3-11 of the LRA If not, provide the basis for excluding permeation/infiltration of salt-laden water or air as an applicable aging process.

3.3 1-18 Sent to AMP Reviewer

What are the frequencies and discusses their basis for the inspections, replacements, and sampling activities? If operating experience is one of the factors, please see also RAI 3 3.1-14

3.3.11-8 became RAI 3 3-1

The LRA stated that the average humidity in the indoor- not air conditioned environment is 73% What is the bounding humidity level one can expect in an indoor- not air conditioned environment at the plant? Is there any applicable aging effect associated with that highest humidity level for the carbon steel bolting? The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect.

3 3 11-8 became RAI 3 3-3,4,5

With reference to the previous three RAI(s) discuss the operating experience, if any on age-related degradation and corrective action taken for any of the embedded/encased piping/fitting components prior to age-related failures

3 3.1-19 Sent to AMP Reviewer

The applicant provided examples of inspections and activities included in the Periodic Surveillance and Preventive Maintenance Program Are these examples of inspection activities representative of a much larger set of inspection activities? Discuss the reasons for selecting these as examples.

3 3.11-9 became RAI 3 3-1

The LRA stated that the average humidity in containment air environment is 73% What is the bounding humidity level one can expect in a containment air environment at the plant? Is there any applicable aging effect associated with that highest humidity level for the carbon steel bolting? The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect.

3.3 1-2* Became 3 3 1-1

In Section 4 1.3 general air/gas environment descriptions is provided for the air/gas environments found in the plant. Aging effects of components exposed to the air/gas environment is dependent, in part, on the type of air/gas environment, the operating temperature, and the water content Provide more specific information on the various air-gas environments Basing on this specific information explain why no aging effects of these components in the air/gas environment were identified as stated in the LRA

3.3 1-20 Sent to AMP Reviewer

Acceptance criteria are tailored for each individual inspection considering the aging effect being managed The applicant provided the following examples
-Inspections for loss of material provide guidance that require evaluation under the corrective action program if there is evidence of loss of material beyond uniform light surface corrosion.
-Visually detectable cracking requires evaluation under the corrective action program.
-Refurbishments and replacements are performed on a specified frequency based on plant experience or equipment supplier recommendations
Are these examples of acceptance criteria representative of a much larger set? Discuss the reasons for selecting these as examples

3 3 1-21 Sent to AMP Reviewer

Does the operating experience of the applicant include any that relate to age-related failures of components that are managed by the Periodic Surveillance and Preventive Maintenance Program? In particular, does the operating experience of the applicant include any that relate to age-related degradation and corrective actions taken prior to age-related failures of components that are managed by the Periodic Surveillance and Preventive Maintenance Program? If there are please provide more specifics.

3 3 12-1 6/19/02ML021780091

The major components in the sampling system consist of valves, tubing/fittings, vessels, and heat exchanger. The valves and tubing/fitting are subject to aging management review. Please explain why vessels and heat exchanger are not subject to aging management review.

3.3 12-2 became RAI 3.3-1

The LRA stated that the average humidity in the indoor (not air-conditioned) and containment air environment is 73% What is the highest humidity level one can expect in a containment air or indoor (not air-conditioned) environment at the plant? Discuss the operating experience, if any on age-related degradation and corrective action taken for the carbon steel bolting prior to age-related failures.

3 3 12-2 6/21/02ML021780147

The LRA stated that the average humidity in the indoor (not air-conditioned) and containment air environment is 73% What is the highest humidity level one can expect in a containment air or indoor (not air-conditioned) environment at the plant? Is there any applicable aging effect associated with that highest humidity level for the carbon steel bolting? The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect.

3 3 12-3 Sent to AMP Reviewer

For the Water Chemistry Control Subprogram the applicant stated that internal surfaces of components are visually inspected for loss of material and other aging effects during routine and corrective maintenance requiring equipment disassembly. Has the sampling system been disassembled for visual inspection of loss of material and cracking? If yes, please provide the inspection results

3 3.1-3* became RAI 3 3-1

The LRA stated that the average humidity in containment air environment is 73% What is the highest humidity level one can expect in a containment air environment at the plant? Discuss the operating experience, if any on age-related degradation and corrective action taken for any of these components in containment air prior to age-related failures.

3 3 13-1 Combined in 3 3-1

The applicnt stated tha the outdoor environment is characterized by moist atmosphere air. Please provide justification for not identifying loss of material due to corrosion as an applicable aging effect for the carbon bolt exposed to outdoor environment

3 3 13-3 Sent to AMP Reviewer

What are the inspection intervals of the Periodic Surveillance and Preventive Maintenance Program for aging management of the affected components of the service water system?

3 3 13-4 Sent to AMP Reviewer

Please describe plant operating experience in the service water system covered by the Periodic Surveillance and Preventive Maintenance Program

3 3 1-4* Became 3 3.2-1

What is the difference, if any between the outdoor environments as described in section 4 2.1 of Appendix C of the LRA and the outdoor environment in the ECCS pipe tunnel? How does this difference, if it exists leads to differences in aging effects?

3 3.14-1 Became 3 3 14-1

What is the composition of the internal air/gas environment that the instrument air compressor cooling water head tank of Unit 1 is exposed to? What is the level of humidity of this particular environment? Would the tank wall be subjected to changing wetting environment as the water level changes? Is loss of materials an applicable aging effect? If not, please provide the basis

3 3 14-2 6/21/02ML021780147

The LRA stated that the average humidity in the indoor- not air conditioned environment is 73% What is the bounding humidity level one can expect in an indoor- not air conditioned environment at the plant? Discuss the operating experience, if any on age-related degradation and corrective action taken for brass tubes and carbon steel bolting in indoor- not air conditioned environment prior to age-related failures

3.3 14-3 became 3 3-2

For all the carbon steel components in the Turbine Cooling water (Unit 1 only) System (even though they themselves may not contain any borated water component) that are exposed to an indoor- not air conditioned external environment are any of them adjacent to other components that may exhibit dripping leaking borated water? If so, is borated water leakage an applicable environment for these components? Recent experience with extensive wastage of the vessel head due to boric acid corrosion (BAC) at the David Bessie Nuclear Power Plant suggests the seriousness of BAC (NRC INFORMATION NOTICE 2002-11: Recent Experience With Degradation Of Reactor Pressure Vessel Head, March 12, 2002) Even though the SCs that are involved in the incident is not related to the turbine cooling water system (Unit 1 only) one needs to ascertain that the carbon steel components are not indirectly exposed to leaking borated fluids from components that are either adjacent or in sufficiently close proximity.

3 3 14-4 6/19/02ML021780091

Basing on RAI 3.3 14-1and pending the responses of the applicant if some aging effects (such as loss of materials) requiring aging management is applicable to that the instrument air compressor cooling water head tank of Turbine Cooling water (Unit 1 only) system in the internal air/gas environment then what are the applicable AMP(s)?

3 3.14-5 6/19/02ML021780091

Basing on RAI 3 3 14-2and pending the responses of the applicant if some aging effects (such as loss of materials) requiring aging management is applicable to the brass tubes and carbon steel bolting components of Turbine Cooling water (Unit 1 only) system in the internal air/gas environment then what are the applicable AMP(s)?

3.3 14-6 6/19/02ML021780091

Basing on RAI 3 3 14-3and pending the responses of the applicant if some aging effects (such as loss of materials) requiring aging management is applicable to the carbon steel components of Turbine Cooling water (Unit 1 only) system in the internal air/gas environment (or in an borated water leaks environment) then is Boric Acid Wastage Surveillance Program an applicable aging management program?

3 3 15-1 becomes 3.3 15-1

For control room air conditioning subsystem, the applicant has identified loss of material as an applicable aging effect for carbon steel filter housing internally exposed to air/gas environment, but not for other carbon steel components (e g , valves and piping/fittings) exposed to the same environment. The applicant is requested to explain this discrepancy

3 3 15-2 6/21/02ML021780147

The applicant has identified loss of material as an applicable aging effect for all the carbon steel components (e g , valves and piping/fitting) externally exposed to indoor-not air conditioned environment except for carbon steel bolting exposed to the same environment. The applicant is requested to explain this discrepancy.

3 3 15-3 6/21/02ML021780147

The applicant has identified loss of mechanical closure integrity, which includes loss of material, cracking, and loss of preload, as an applicable aging effect for the carbon steel bolting externally exposed to borated water leaks in all the ventilation system subsystems except one In the reactor auxiliary building main supply and exhaust subsystem, loss of material instead of loss of mechanical closure integrity has been identified as an applicable aging effect for carbon steel bolting The applicant is requested to explain this discrepancy

3 3.15-4 Inspection Team

The chemistry control program mitigates loss of material at the inside surface of the components exposed to treated water. The effectiveness of this program needs to be assessed A one-time inspection of the inside surface of these components at susceptible locations may provide a check on the effectiveness of this program The applicant is requested to provide information about how he plans to ensure the effectiveness of the chemistry control program.

3.3 15-5 6/19/02ML021780091

The applicant is requested to provide information about whether there are any inaccessible locations on the affected carbon steel components and flexible connections If so, how the aging effects of loss of material (on the outside surface) and cracking at those locations will be managed?

3 3 15-6 6/19/02ML021780091

The applicant relies on detection of leakage for managing loss of material on the inside surface of several components exposed to air/gas environment The presence of leakage from a component, however, would indicate that the component has lost its ability to perform its intended function, i e , pressure boundary integrity How does the applicant plan to ensure that the component's capability to perform its intended function is not compromised? Does the applicant plan to manage loss of material in these components by periodic replacement? If so, at what frequency such replacement may be performed? How the replacement frequencies are determined?

3.3 1-6 Sent to AMP Reviewer

For the Water Chemistry Control Subprogram the applicant stated that monitoring of key parameters at established frequencies with well-defined acceptance criteria for piping and associated components is carried out Provide more specifics on the monitoring process, key parameters, frequencies and acceptance criteria

3 3.16-1 Became 3.3 16-1

In Table 3 3-13 of the LRA, the applicant identified loss of material as applicable aging effect for the stainless steel yard sump pump of the service water system exposed to internal environment of raw water (drains) and identified Periodic Surveillance and preventive Maintenance Program as the applicable AMP. Why loss of material is not identified as an applicable aging effect for the stainless steel valves and piping/fitting of the waste management system exposed to the same environment of raw water (drains)?

3 3 16-2 6/19/02ML021780091

Please provide justification for not identify fouling as an applicable aging effect for the SS drain pipe exposed to the internal environment of raw water (drains)

3 3.16-3 6/19/02ML021780091

The strainer elements are exposed to internal environment of air/gas The intended function of the strainer elements is filtration Please provide justification for not identify fouling as an applicable aging effect for the strainer elements

3 3 16-4 became 3 3-3

The outdoor environment at St Lucie contains moist, salt-laden atmospheric air, with temperature at 27 F-93 F, 73% average humidity, and exposure to weather, including precipitation and wind Therefore the outdoors environment also contains chlorides and moisture Are the issues raised in RAI 3 3 11-4 applicable for the fire protection components in embedded/encased environment? If so, what are the applicable AMPs? If not please provide the basis

3.3 16-5 Sent to AMP Reviewer

Please describe the plant operating experience in the waste management system covered by the Systems and Structures Monitoring Program

3 3 1-7 Sent to AMP Reviewer

For the Water Chemistry Control Subprogram the applicant stated that internal surfaces of components are visually inspected for loss of material and other aging effects during routine and corrective maintenance requiring equipment disassembly. Are the locations for inspection including all representative susceptible locations (such as low flow/stagnant areas)? Would any potentially susceptible locations be missed in these routine and corrective maintenance procedures requiring equipment disassembly? Provide more specifics on the level of inspection (VT-1 etc ?) conducted

3 3 1-8 Sent to AMP Reviewer

It was stated that tank inspection and water removal are performed as part of the Periodic Surveillance and Preventive Maintenance Program and that these measures are effective in mitigating internal corrosion Is coating used to mitigate corrosion? If not, please provide justification.

3 3 1-9 Sent to AMP Reviewer

Why is more recent versions of ASTM Standards (such as D4057-95, D2276-00) not used? Identify significant differences between the versions used and the more recent versions, if any What are the other ASTM Standards that are utilized for fuel oil testing as specified in the St Lucie Units 1 and 2 Technical Specifications?

3 3 2-1* draft RAI 3.3 2-2

In Appendix C, Section 4 1.1, applicant states that for environment with extremely low oxygen content (less than 0.1 ppm) crevice corrosion is insignificant Also the applicant states that oxygen is required for pitting corrosion. The staff does not agree with this discussion on the role of oxygen in crevice and pitting corrosion because oxygen can be a contributor but is not needed for crevice and pitting corrosion of metal The applicant is requested to provide references supporting its position. In addition, provide what might be oxygen and chloride content in the treated water (i.e., component cooling water with corrosion inhibitors added) so that the susceptibility to pitting and crevice corrosion for a component exposed to treated water can be assessed.

3 3 2-10 became RAI 3 3-2

The applicant is requested to clarify whether the carbon steel surge tanks, pump bodies and heat exchanger shells in the CCW system are likely to be externally exposed to borated coolant leaking from an adjacent system or component containing borated coolant. If so, then provide an aging management program to manage loss of material that these components may experience due to their exposure to leaking borated coolant.

3.3 2-10* 6/21/02ML021780147

The applicant is requested to clarify whether the carbon steel surge tanks, pump bodies and heat exchanger shells in the CCW system are likely to be externally exposed to borated coolant leaking from an adjacent system or component containing borated coolant If so, then provide an aging management program to manage loss of material that these components may experience due to their exposure to leaking borated coolant

3 3 2-11* became RAI 3 3 2-5

The applicant states that the Intake Cooling Water Inspection Program implements the applicable surveillance testing and inspection aspects of the GALL program The staff does not agree with this statement because the Intake Cooling Water Inspection Program includes inspection of only those CCW system components that are exposed to raw water: CCW heat exchanger tubes, tubesheets channels and doors. The GALL program requires inspection of these components and other CCW system components, which are exposed to treated water, susceptible to loss of material The applicant is requested to explain this discrepancy between the Chemistry Control Program as described in Section 3 2.5 2 of Appendix B to the LRA and the AMP X1.M21 in the GALL report.

3 3 2-12 Sent to AMP Reviewer

The applicant is requested to provide the bases for the determination of corrosion rates and for the techniques that will be used in the new program described in Section 3 1.2, "Galvanic Corrosion Susceptibility Inspection Program," of Appendix B to the LRA

3 3 2-12* 6/21/02ML021780147

Stress corrosion cracking has been observed during the metallurgical examination of component cooling water heat exchanger tubes at Turkey Point plants Explain why the component cooling water heat exchanger tubes at St Lucie plants are not susceptible to similar cracking

3 3.2-13 Sent to AMP Reviewer

In Section 3 1.3, "Pipe Wall Thinning Inspection Program," of Appendix B to the LRA, the applicant states that this inspection is credited for managing the internal loss of material due to erosion. But later in describing the monitoring and trending aspect of the program, the applicant refers to corrosion rates. The applicant states, " The initial inspection frequency shall be established based on the first inspection results and considering measured wall thickness, corrosion rates, and minimum required wall thickness The applicant is requested to explain this inconsistency between the erosion rates and corrosion rates In addition, explain how those rates are determined

3.3 2-14 Sent to AMP Reviewer

The updated FSAR for St Lucie Unit 1 states that the CCW heat exchanger components exposed to raw water are protected by sacrificial anodes located in the heat exchangers Are these sacrificial anodes credited in reducing the corrosion or cracking? Does the intake cooling water system inspection program include inspection of these anodes?

3 3.2-15 Sent to AMP Reviewer

The applicant stated that during inspections performed as part of the intake cooling water system inspection program, visual examination of the internal surface of piping/components and their internal linings and coatings is performed Volumetric examinations may be performed to measure internal and external surface conditions of piping/components, and the extent of thinning based on the examination results. Describe whether these visual and volumetric inspections include inspection of component cooling water heat exchanger tubesheets, channels and doors to detect aging effect of loss of material

3 3 2-16 Sent to AMP Reviewer

The applicant states that as part of the intake cooling water system inspection program, heat exchanger differential pressure, flow, and temperatures are monitored during normal operation to ensure that the design-basis heat transfer capability is maintained and to determine when component cooling water heat exchanger cleaning and inspection are required Describe what criteria are used to ensure that the intake cooling water design-basis flow rate is maintained.

3.3 2-17 Sent to AMP Reviewer

The applicant is requested to identify the specific plant procedures and applicable documents that contain detailed guidance related to the performance monitoring, testing and tube examinations of the component cooling water system heat exchangers Also, the applicant is requested to provide the acceptance criteria and basis for the evaluation of the heat exchangers inspection results

3.3 2-18 Sent to AMP Reviewer

In the description of the intake cooling water system inspection program, the applicant states that branch connections are examined as plant/industry experience warrants Describe which aging effects has been observed at the branch connections including the corresponding root causes of those aging effects In addition, describe whether the branch connections have experienced cracking

3 3 2-2 6/21/02ML021780147

the applicant is requested to provide data for the following parameters for treated water that affect FAC oxygen content, pH level, and flow velocities in component cooling water. The applicant is requested to justify why the control room air conditioning CCW return piping and other carbon steel piping in the CCW system are not susceptible to FAC. Specifically, include the response with the data for flow velocity, oxygen content and pH level in treated water.

3 3 2-20 Sent to AMP Reviewer

The applicant states that the systems and structures monitoring program described in Section 3 2 14 of Appendix B to the LRA will be enhanced for performing inspections of insulated equipment and piping. The applicant is requested to provide information about whether there are any CCW components that are insulated, and if so, then at what frequency and sample size these components will be inspected during the renewed license period

3 3.2-3 became 3 3 2-2

The applicant has not identified cracking due to SCC as an aging effect for the CCW system components exposured to treated water. The applicant is requested to provide a bases for excluding cracks as an applicalbe aging effect for CCW system carbon and stainless steel components exposed to treated water

3 3 2-4* became 3 3.2-3

The applicant has not identified cracking due to SCC as an aging effect for the component cooling water system heat exchanger tubes exposed to raw water. The operating experience at Turkey Point, however, shows that the component cooling water heat exchanger tubes, which are made of aluminum brass and exposed to raw water on the tube side, are susceptible to stress corrosion cracking (See USNRC, "Safety Evaluation Report with Open Items Related to the License Renewal of Turkey Point Nuclear Plant, Units 3 and 4," August 2001, p 239). The applicant is requested to provide bases for excluding cracking as an applicable aging effect for CCW heat exchanger tubes exposed to raw water at St Lucie

3 3.2-5* became 3 3 2-4

Aging effects for CCW system components exposed to the air/gas environment is dependent, in part, on the type of air/gas environment, the operating temperature, and the water content The applicant is requested to provide the characteristics parameters of the air/gas environments applicable to the components found in the CCW system and to provide the bases by which the determination of no aging effects requiring management was made for all the components exposed to the air/gas environment.

3.3 2-6 6/21/02ML021780147

In Section 5.2, "Cracking," of Appendix C to the LRA, the applicant states that the stainless steel piping externally exposed to marine environment (e g , outdoor environment for component cooling water (CCW) system) is susceptible to transgranular stress corrosion cracking (TGSCC). However, in Table 3 3-2 of the LRA, the applicant does not identify cracking as an applicable aging effect for the stainless steel CCW components exposed to external outdoor environment The applicant is requested to provide the bases for excluding cracking as an applicable aging effect for the CCW stainless steel components exposed externally to outdoor environment

Disposition Draft RAI 3.3 1-4 and draft RAI 3 3 2-6 address the differences between the effects of outdoor environments on stainless steel components and the effect of the outdoor environment on stainless steel piping in the emergency core cooling system pipe tunnel These draft RAIs will be combined and issued as RAI 3 3 1 - 2

3 3 2-6* became 3 3 1-4

The applicant is requested to provide the characteristics paramenters of the air/gas environments appicable to the components found in the CCW system and to provide the bases by which the determination of no aging effects requiring management was made for al the components exposed to the air/gas environment

3 3 2-7 became RAI 3 3-1

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to outdoor environment. The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to outdoor environment

3.3 2-7* 6/21/02ML021780147

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to outdoor environment The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to outdoor environment.

3 3 2-8 became RAI 3.3-1

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to not air-conditioned environment The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to not air-conditioned environment

3 3 2-8* 6/21/02ML021780147

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to not air-conditioned environment. The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to not air-conditioned environment.

3 3 2-9 became RAI 3 3-1

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to containment air environment The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to containment air environment.

3 3 2-9* 6/21/02ML021780147

The applicant has identified loss of material as an aging effect for all carbon steel components except bolting exposed externally to containment air environment The applicant is requested to provide bases for excluding loss of material as an aging effect for carbon steel bolting exposed externally to containment air environment.

3 3.3-1* 6/21/02ML021780147

What demineralized makeup water system components, if any, have had borated water leakage as an applicable external environment?

3 3 3-2 Sent to AMP Reviewer

Discuss the operating experience, if any, on age-related degradation and corrective action taken for these components in an indoor not air conditioned environment prior to age-related failures

3 3 3-3 Sent to AMP Reviewer

The Chemistry Control Program contains three subprograms Please specify which part and which subprogram(s) are credited to manage aging of the components of the Demineralized Makeup Water System Address all the RAI(s) for those part of the Chemistry Control Program (see section on the Chemical and Volume Control of this list of RAI(s)) that are applicable to manage aging of the components of the Demineralized Makeup Water System

3 3 3-4 Sent to AMP Reviewer

Is the Intake Cooling Water Inspection Program an applicable AMP as a result of crediting the Chemistry Control Program for the aging management of the components of the Demineralized Makeup Water System? If so, please address all RAI(s) on the surveillance testing and inspection aspects of the Intake Cooling Water Inspection Program that are applicable to the aging management of the components of the Demineralized Makeup Water System If Intake Cooling Water Inspection Program is not an applicable AMP, please provide the basis and specify the applicable AMP.

3 3.4-12 Sent to AMP Reviewer

Describe any aging effects in the inaccessible areas in the Auxiliary Systems that are managed by the Systems and Structures Monitoring AMP.

3 3 4-13 Sent to AMP Reviewer

What are the inspection intervals for the affected components of the diesel generators and support systems in the Systems and Structures Monitoring AMP? Is detection of leakage included in the inspection of the diesel generators and support systems? What are the typical inspection intervals for the seven Auxiliary Systems in the Systems and Structures Monitoring AMP?

3.3 4-14 Sent to AMP Reviewer

The applicant stated in the acceptance criteria of the Systems and Structures Monitoring AMP that guidance includes specific parameters to be monitored and criteria to be used for identified degradation. Describe the criteria used for identification of loss of material, cracking, and fouling in the seven Auxiliary Systems components

3 3 4-15 Sent to AMP Reviewer

The applicant stated in the acceptance criteria of the Systems and Structures Monitoring AMP that system walkdowns are performed as part of the AMP. How often system walkdown is performed? Are inspections and examination performed during system walkdown?

3 3 4-16 Sent to AMP Reviewer

Describe the plant operating experience in the seven Auxiliary Systems covered by the Systems and Structures Monitoring AMP in terms of aging effects found and corrective actions took place including the diesel generators and support systems

3 3 4-17 Sent to AMP Reviewer

Provide the inspection frequencies for the affected diesel generators and support systems components managed by the Periodic Surveillance and Preventive Maintenance Program Is replacement or refurbishment applicable for the affected diesel generators and support systems components?

3.3 4-18 GALL not requirement

The GALL report identifies loss of material as an aging effect for carbon steel piping/fitting, valves, drain trap, air accumulation vessel, filter, and muffler in the starting air and intake system exposed the internal environment of moisture air. Describe why these components are not included in the LRA or included in the LRA but requiring no aging management review.

3.3 4-19 Sent to AMP Reviewer

Describe the frequency of internal tank inspection, inspection techniques and acceptance criteria for the fuel oil tanks and the day tanks

3 3.4-20 Sent to AMP Reviewer

Provide justification for not addressing surveillance testing and inspection in the Closed-Cycle Cooling Water System Chemistry Program AMP and provide operating experience for cooling water pumps and cooling water radiators in the diesel generator cooling water system.

3 3 4-4* 6/19/02ML021780091

Unit 2 includes strainers and filters in the fuel oil system to prevent detrimental effects of fuel oil tank bottom sediment on diesel performance Provide justification for not including the strainers and filters in Table 3 3-4 and provide operating history of the strainers and filters What is the interval of replacement of the filters?

3 3 4-5 6/21/02ML021780147

Are there any underground piping and components in the diesel generators and support systems that are managed by the Galvanic Corrosion Susceptibility Inspection AMP and subject to inspections?

Resolution The information requested by the staff is available in the license renewal boundary drawings provided by the applicant On boundary drawing 1-EDG-01, the applicant indicates that the underground fuel oil piping is protected by guard pipes, which eliminate the possibility of galvanic corrosion

3 3 4-5* 6/21/02ML021780147

Is underground piping and components in the Auxiliary Systems covered by the Galvanic Corrosion Susceptibility Inspection AMP and subject to inspections? Are there any underground piping and components in the diesel generators and support systems that are managed by the Galvanic Corrosion Susceptibility Inspection AMP and subject to inspections?

3 3 4-6 became 3 3-1

Is component's wall thickness measured during visual inspections or volumetric examinations for accessing the extent of material loss in the Galvanic Corrosion Susceptibility AMP. If not, what are the parameters measured during visual inspections or volumetric examinations and provide the basis

3 3 4-6* 6/21/02ML021780147

Why bolting in the diesel generator support systems exposed to outdoor or indoor environments does not require aging management review? The applicant stated in the Systems and Structures Monitoring AMP that inspection includes welding and bolting

3 3 4-7 Became 3 3 4-4

The GCSI AMP manages potential loss of material due to galvanic corrosion for the seven Auxiliary Systems; the diesel generators and support systems is one of the seven systems Will the greatest susceptibility locations be selected for each system or for all the systems? If the selected greatest susceptibility locations are based on all systems, will the piping/fitting and cooling water radiator headers of the diesel generator cooling water system be selected as the greatest susceptibility locations subject to inspection and volumetric examination?

3 3 4-7* became 3.3 4-4

Footnotes of Table 3 3-4 stated that plant experience shows a history of loss material due to corrosion of the copper and aluminum cooling water radiator fins in the cooling water system exposed to external indoor (not-air conditioned) environment Explain why other copper and aluminum alloy components exposed to indoor or outdoor environments in the diesel generators and support systems are not subject to aging management? These components include tubing/fittings, air start motors, air start motor lubricators, frame arrestors (in outdoor environment), and filter housings

3 3 4-8 became 3 3 4-1

In Section 9 5 6 3, "System Evaluation," on page 9.5-12b of the Unit 2 updated Final Safety Analysis Report (UFSAR), the applicant states that the air receiver for the air-start system of the emergency diesel generator collects moisture to preclude fouling of the air-start valve with moisture and contamination. Provide justification for not identifying loss of material as an aging effect for the carbon steel, aluminum alloy, and copper alloy air-start system components that are exposed to the internal moist air environment

3.3 4-8 6/19/02ML021780091

Describe the plant-approved procedures and inspection techniques used in the inspection and examination to access the extent of loss of material due to galvanic corrosion in the Galvanic Corrosion Susceptibility AMP.

3 3 4-9 Sent to AMP Reviewer

Provide the basis for not including the intake cooling water system within the scope of the Galvanic Corrosion Susceptibility AMP for managing loss of material due to galvanic corrosion.

3 3.5-1 3.3-3, 3 3-4, 3.3-5

In table 3 3-5 what is the environment to which the concrete with embedded/encased carbon steel piping/fitting is exposed? Is that environment raw water-salt water, outdoor air, or some others? The raw water-salt water environment contains chlorides Outdoor environment is defined in the St Lucie LRA as moist, salt-laden atmospheric air, with temperature at 27F-93F, 73% average humidity, and exposure to weather, including precipitation and wind Therefore, the outdoors environment also contains chlorides. These chlorides will reach the steel/concrete interface in the interior of the concrete through the process of permeation/infiltration through the pores of the concrete Accumulation of high enough levels of chlorides will result in attacks and disruption of the protective film formed on the surfaces of the steel due to the originally high pH levels in the concrete environment. Once some particular region of the protective film is destroyed localized corrosion of the steel begins through an electrochemical process The applicant has stated that no aging effects for components in the emergency cooling canal system associated with external exposure to an embedded/encased environment are identified in Table 3 3-5

Has the applicant considered the corrosion of embedded/encased steel through the process described above? If this aging process is not applicable to St. Lucie, please provide the justification. The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect.

3 3 5-1* 6/21/02ML021780147

In table 3 3-5 what is the environment to which the concrete with embedded/encased carbon steel piping/fitting is exposed? Is that environment raw water-salt water, outdoor air, or some others? Accumulation of high enough levels of chlorides will result in attacks and disruption of the protective film formed on the surfaces of the steel due to the originally high pH levels in the concrete environment. Once some particular region of the protective film is destroyed localized corrosion of the steel begins through an electrochemical process. The applicant has stated that no aging effects for components in the Emergency Cooling Canal system associated with external exposure to an embedded/encased environment are identified in Table 3 3-5. Has the applicant considered the corrosion of embedded/encased steel through the process described above? If this aging process is not applicable to St Lucie please provide the justification.

3 3 5-2 3 3-3, 3 3-4, 3 3-5

If the concrete structure is only exposed to atmospheric air with negligible levels of chlorides, the embedded/encased steel piping/fittings may still be susceptible to a corrosion process due to the carbon dioxide present in the atmospheric air. This corrosion process operates via the generation of carbonic acid which reduces the pH level in the vicinity of the steel/concrete interface. This neutralization process in turn disrupts the passivity of the protective films and permits the attack on the underlying steel substrate The water/cement ratio of the concrete is an important factor in affecting the rate of this corrosion process Has the applicant considered the corrosion of embedded/encased steel through the carbonation process (which is unrelated to chloride ions) described above? If this aging process is not applicable to St. Lucie please provide the justification The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect

3 3 5-2* 6/21/02ML021780147

If the concrete structure is only exposed to atmospheric air with negligible levels of chlorides present the embedded/encased steel piping/fittings may still be susceptible to a corrosion process due to the carbon dioxide present in the atmospheric air Has the applicant considered the corrosion of embedded/encased steel through the carbonation process (which is unrelated to chloride ions) described above? If this aging process is not applicable to St. Lucie please provide the justification.

3 3 5-3 3 3-3, 3 3-4, 3 3-5

In Section 3 5 2.3 2 of the LRA, the applicant stated that aggressive chemical attack, leading to corrosion of reinforcing steel and embedded steel, was identified as an age-related degradation mechanism for concrete structural components At St Lucie Units 1 and 2, this is applicable to concrete structural components exposed to the groundwater, salt water flow, or salt water splash (intake cooling water system discharge) The applicant described the structures with concrete structural components located below groundwater elevation as including the intake structures, the intake, discharge, and emergency cooling canals, the reactor auxiliary buildings, and the steam trestle areas The intake structures and the intake, discharge, and emergency cooling canals concrete structural components are also exposed to high chlorides due to the flow of salt water. Based on the above, the applicant concluded that loss of material due to aggressive chemical attack leading to corrosion of reinforcing and embedded steel is an aging effect that requires aging management for concrete structural components below groundwater elevation, exposed to salt water flow, or exposed to salt water splash

Does the above description include the process of infiltration/permeation of salt-laden water or air through the porosity of the concrete to the steel/concrete interfaces in the concrete interior? If so, please refer to RAIs 3 3 5-1 and 3 3.5-2 and provide the basis for not including aging effect requiring aging management for embedded/encased carbon steel piping/fitting in Table 3 3-5 of the LRA. If not, provide the basis for excluding permeation/infiltration of salt-laden water or air as an applicable aging process The applicant is also requested to discuss the operating history to support its conclusion on the applicable aging effect

3 3 5-3* 6/21/02ML021780147

The applicant concluded that loss of material due to aggressive chemical attack leading to corrosion of reinforcing and embedded steel is an aging effect that requires aging management for concrete structural components below groundwater elevation, exposed to salt water flow, or exposed to salt water splash Does the above description include the process of infiltration/permeation of salt-laden water or air through the porosity of the concrete to the steel/concrete interfaces in the concrete interior? If so, please refer to RAI 3.3 5-1 and 3.3 5-2 and provide the basis for not including aging effect requiring aging management for embedded/encased carbon steel piping/fitting in Table 3 3-5 of the LRA If not, provide the basis for excluding permeation/infiltration of salt-laden water or air as an applicable aging process.

3 3 5-4 Sent to AMP Reviewer

Lube oil could contain contaminants and/or moisture. GALL Report recommends one-time inspection for the reactor coolant pump oil collection tank to ensure loss of material does not occur. Please provide justification for not including one time inspection for the reactor coolant pump oil collection tanks in the AMP.

3 3 5-4 Sent to AMP Reviewer

Discuss the operating experience, if any on age-related degradation and corrective action taken for any of the embedded/encased piping/fitting components prior to age-related failures

3 3 5-4* 6/19/02ML021780091

If some aging effects (such as loss of materials) requiring aging management is applicable to the embedded/encased piping/fitting components of the Emergency Cooling Canal system then what are the applicable AMP(s)?

3 3.5-6 Sent to AMP Reviewer

Embedded/encased carbon steel piping/fitting is closely similar to the embedded steel structural element included by the applicant in terms of applicable aging effects Does embedded/encased carbon steel piping/fitting have similar aging effects and require similar aging management as embedded steel?

3 3 5-7 Sent to AMP Reviewer

Are these AMP(s) (such as the ASME Section XI, Subsection IWE Inservice Inspection Program and the Systems and Structures Monitoring Program) applicable to aging management for non-structural components such as embedded/encased carbon steel piping/fitting that are inaccessible?

3.3 5-8 Sent to AMP Reviewer

The applicant stated that structural components inaccessible for inspection are managed by inspecting accessible structures with similar materials and environments for aging effects that may be indicative of aging effects for inaccessible structural components Please provide more specifics on this indirect aging management methodology for the case of managing aging of embedded/encased carbon steel piping/fitting What is the analogous aging process, component, materials and environment used for comparative evaluation? Please provide the basis for the reliability and adequacy of this type of evaluation by analogy. Have more direct but still remote monitoring/inspection techniques been considered such as those that involve direct probing of the external surfaces of the concrete via electrical measurements which will provide information on the corroding versus non-corroding regions of the concrete interior? If these and related direct techniques are not applicable to aging management of embedded/encased carbon steel piping/fitting please provide the basis

3 3 6-1 Deleted

The applicant identified the applicable aging effects in the raw water (city water) environment include loss of material due to corrosion for the carbon steel, cast iron, copper alloy, and stainless steel components What types of corrosion were identified for these materials exposed to raw water?

3 3 6-1* Became 3 3 6-1

The applicant identified that loss of material due to selective leaching is an applicable aging effect Please identify those components, the susceptible locations, and inspection techniques

3 3 6-11 Sent to AMP Reviewer

Provide the frequencies of test and inspection for the fire protection systems components and the frequencies of the flushing and system performance test.

3 3.6-12 Sent to AMP Reviewer

Describe the inspection frequency and acceptance criteria for the sprinkle heads

3 3 6-2* Became 3 3 6-2

The fire water supply system consists of a 12 inch cement lined cast iron underground pipe that loops around the plant. Please describe the cement lining and provide the basis for not including the cement lining as an internal environment

3 3 6-3* 6/19/02ML021780091

Lube oil could contain contaminants and/or moisture GALL Report recommends one-time inspection for the reactor coolant pump oil collection tank to ensure loss of material does not occur. Please provide justification for not including one time inspection for the reactor coolant pump oil collection tanks in the AMP

3.3 6-5* Became 3 3 6-4

The applicant stated that functional and flushing of the systems clears away internal scale and corrosion products that could lead to blockage or obstruction of the system. Providing the basis for not including biofouling as applicable aging effect The GALL Report identifies biofouling as an aging effect for the fire water supply systems

3 3 6-6 Sent to AMP Reviewer

GALL Report identifies loss of material as an applicable aging effect for fuel oil supply line of the fire water pump Please provide justification for not identifying loss of material as applicable aging effect for the fuel oil supply line

3 3 6-7 Sent to AMP Reviewer

Loss of material is an applicable aging effect for the carbon steel reactor coolant pump oil collection tanks exposed to external environment of containment air. The applicant credited the Systems and Structures Monitoring Program for managing the aging effect Describe the inspection technique and frequency of inspection.

3 3 6-8 Sent to AMP Reviewer

The applicant described the Fire Protection AMP combines the appropriate scope of the two GALL Report programs, XI M26, "Fire Protection," and "XI M27,"Fire Water System." The GALL Report program XI M26, " Fire Protection," contains a diesel-driven fire pump inspection program. Are the diesel fire water pumps periodically tested to ensure that the fuel supply line can perform the intended function?

3 3 6-9 Sent to AMP Reviewer

Describe the test and the test frequency of the halon system

3 3.7-1 2 3-19

In Table 3 3-7 of the LRA, the applicant noted that heat transfer is not a license renewal intended function for the Unit 1 spent fuel pool heat exchangers (Section 2 3 3 7 of the LRA) Is this because of the differences in the safety-related means through which decay heat is removed from the fuel pool in Unit 1 and Unit 2, in particular with Unit 1 not relying on forced circulation through the heat exchanger? If not, please provide more specifics

Resolution· The information requested by the staff is available on page 2.3-19 of the LRA In Section 2 3 3 7, " Fuel Pool Cooling," of the LRA on page 2.3-19, the applicant states that the safety-related means of fuel pool cooling for Unit 1 is pool boil off and system makeup from intake cooling water without forced circulation through the heat exchange. The safety-related means of fuel pool cooling for Unit 2 is recirculation through the fuel pool heat exchangers.

3 3.7-1* 6/21/02ML021780147

In table 3 3 -7 of the LRA the applicant noted that heat transfer is not a license renewal intended function for the Unit 1 spent fuel pool heat exchangers (Section 2 3.3 7 of the LRA) Is this because of the differences in the safety related means through which decay heat is removed from the fuel pool in Unit 1 and Unit 2, in particular with Unit 1 not relying on forced circulation through the heat exchanger? If not, please provide more specifics.

3.3 7-2 Sent to AMP Reviewer

The applicant stated that fouling is not an applicable aging effect that requires aging management for the Unit 1 spent fuel pool heat exchanger tubes in Table 3 3-7 of the LRA Please provide the basis for this conclusion, including if applicable, a discussion of the issues raised in RAI 3 3 7-1

3.3 7-3 Sent to AMP Reviewer

The Chemistry Control program has three subprograms Which subprogram is applicable to manage the aging effects of the Fuel Pool Cooling System components such as valves? Is the water chemistry control subprogram the applicable subprogram of the AMP? The applicant stated that the Water Chemistry Control subprogram is consistent with the ten attributes of the AMP XI M2 "Water Chemistry" in the GALL report (NUREG 1801, Vol II, July, 2001) except that no special one-time inspections are required at St. Lucie If the water chemistry control subprogram is the applicable subprogram please address the RAI 3.3 1-6 and -7 in section 3.3 1 3 2 of this draft TER in the context of the applicable components for the Fuel Pool Cooling System

3 3.7-4 Sent to AMP Reviewer

Which subprogram is applicable to manage the aging effects of the Fuel Pool Cooling System heat exchangers components? If it is the Closed Cycle Cooling Water System Chemistry subprogram please state so The applicant is requested to address the RAI(s) (RAI 3 3.2-12, 18-22) on the surveillance testing and inspection in the context of the applicable heat exchanger components for the Fuel Pool Cooling System.

3 3 7-5 Sent to AMP Reviewer

Please address RAI 3.3 4-6, -7 and -8 raised in section 3 3 4. on the aging management programs of the Diesel Generators and Support Systems in the context of the applicable heat exchanger components for the Fuel Pool Cooling System

3.3 7-6 Sent to AMP Reviewer

Please address RAI 3 3 4-13, -14 and -15 raised in section 3.3 4. on the aging management programs of the Diesel Generators and Support Systems in the context of the applicable heat exchanger components for the Fuel Pool Cooling System.

3 3 8-1* 6/19/02ML021780091

The applicant is requested to provide information about whether any portion of the instrument air compressor cooler shell is internally exposed to the moist air/gas environment. If so, provide the corresponding aging effects for the shell. Also provide AMPs for managing these effects.

3.3 8-2* 6/19/02ML021780091

All the carbon steel components in the instrument air system are externally exposed to indoor-not air conditioned, outdoor or containment air environment The applicant has identified loss of material as an applicable aging effect for all these components, except carbon steel bolting The applicant is requested to explain this apparent discrepancy.

3 3 8-3 6/21/02ML021780147

The applicable aging effect for several carbon steel and galvanized carbon steel components in the instrument air system externally exposed to leaking borated coolant is loss of material. In the case of bolting it is loss of mechanical closure integrity. The applicant is requested to provide information about whether the other carbon steel components such as instrument air receivers, dryers, and compressor cooler shells are likely to be exposed to leaking borated coolant from an adjacent system or component containing borated coolant If so, then provide an aging management program to manage loss of material that these components may experience due to their exposure to leaking borated coolant

3 3 8-3* became RAI 3 3-2

The applicant is requested to provide information about whether the other carbon steel components such as instrument air receivers, dryers, and compressor cooler shells are likely to be exposed to leaking borated coolant from an adjacent system or component containing borated coolant If so, then the applicant should identify loss of material as an aging effect for these components and provide an appropriate AMP for managing that effect

3 3 8-4 Became 3 3 8-1

In Section 3.3 3 1, "Industry Experience," of the LRA, the applicant has not identified any documents related to operating experience with instrument air system components The applicant is requested to provide the list of documents that were reviewed for identifying the relevant aging effects for the instrument air system components. Specifically, the applicant is requested to discuss whether it has reviewed the NRC Generic Letter 88-14, "Instrument Air Supply Problems Affecting Safety-Related Equipment," August 8, 1988, and other industry and NRC documents as referenced in Section XI M24, "Compressed Air Monitoring," of the GALL Report, NUREG-1801, vol 1

3 3 8-5 Inspection Team

The applicant is requested to provide information about whether the program is based on the Instrument Society of America's Standard ISA-S7.0.1-1996, "Quality Standards for Instrument Air." Specifically the applicant is requested to discuss whether the moisture content and particulate size in the instrument air are continuously monitored What are the acceptance criteria for particulate size and oil content in the instrument air? How often the system is sampled to ensure that air quality is maintained

3 3 8-5* Inspection Team

The applicant is requested to provide information about the inspection and testing frequency used for the instrument air system components Does the program follow the recommendations made by the industry report EPRI NP-7079, "Instrument Air Systems - A Guide for Power Plant Maintenance Personnel," 1990, or its 1998 revision (i e , EPRI/NMAC TR-108147, 1998)?

3 3 8-6 6/19/02ML021780091

The applicant is requested to provide information about whether there are any inaccessible surfaces of instrument air system carbon steel, plastic and rubber components exposed to indoor-not air conditioned, outdoor, or containment air environment If so, will the program be enhanced to manage aging effects for these inaccessible surfaces during the extended period of operation?

3 3 8-7 Sent to AMP Reviewer

The chemistry control program is a mitigative program. The applicant is requested to provide information about the aging management activities that would be followed to assess the effectiveness of the program in managing loss of material and fouling in the instrument air compressor cooler components exposed to treated water environment.

3.3 9-1 Combined in 3 3-1

Explain why loss of material is not an aging effect for stainless piping/fittings and tubing/fittings in the intake cooling water system that are exposed to an indoor-not air conditioned environment

3.3 9-1* 6/21/02ML021780147

Several carbon steel components in the intake cooling water system are externally exposed to indoor-not air conditioned, outdoor, raw water or buried environment The applicant has identified loss of material as an applicable aging effect for all of these components except for carbon steel bolting The applicant is requested to explain why loss of material is not an applicable aging effect for carbon steel bolting exposed to indoor-not air conditioned, outdoor, or buried environment

3.3 9-11 Sent to AMP Reviewer

For the buried or submerged carbon steel piping in intake cooling water system, which is externally exposed to aggressive external environments, the Intake Cooling Water System Inspection Program does not provide sufficient information about how the applicant plans to prevent/mitigate/detect/trend loss of material caused by corrosion at the outside surface of these piping. Does the applicant plan to use the wall thickness measurements as indicators of loss of material at the external surface of buried and submerged carbon steel piping? If so, then describe how these wall thickness would be measured.

3.3 9-2 6/21/02ML021780147

Several bronze, aluminum bronze, and aluminum brass components in the intake cooling water system are externally exposed to outdoor or indoor-not air conditioned environments These components include pump and valve bodies and piping/fittings The applicant states that there is no applicable aging effect for these components In Section 5 1 of Appendix C to the LRA, however, the applicant states, "Additionally, bronze and brass are considered susceptible to pitting when zinc content is greater than 15%, and aluminum bronze is considered susceptible to pitting when the aluminum content is greater than 8% "
Since the zinc content in brass can be greater than 15% and the aluminum content in aluminum bronze may vary from 4 to 15%, explain why loss of material is not an applicable aging effect for the bronze, aluminum bronze, and aluminum brass components in the intake cooling water system

3 3 9-2* became 3 3-2

The applicant is requested to provide information about whether the carbon steel components, i e., basket strainers and valve bodies, in the intake cooling water system are likely to be exposed to borated water leaking from an adjacent system or component containing borated water. If so, then the applicant should identify loss of material as an aging effect for these components and provide an appropriate AMP for managing that effect.

3 3.9-3* 6/21/02ML021780147

The embedded carbon steel components, however, are susceptible to corrosion if chlorides are present in fresh concrete mix or if chlorides diffuse through cured concrete from the external environment In addition, leaching and carbonation may reduce the pH level of concrete to a sufficiently low level so that the embedded carbon steel components become susceptible to corrosion. The applicant is requested to describe the external environment for the concrete embedment and provide basis for excluding loss of material as an aging effect for the embedded carbon steel piping/fittings

3 3.9-4* became RAI 3 3-1

The applicant has identified loss of material as an applicable aging effect for only the pump bodies and not for any other stainless steel component The applicant is requested to explain why loss of material is not an applicable aging effect for the other stainless steel components externally exposed to indoor-not air conditioned environment.

3 3.9-5* Became 3 3 9-2

In Section 5 1 of Appendix C to the LRA, the applicant, however, states, "Additionally, bronze and brass are considered susceptible to pitting when zinc content is greater than 15%, and aluminum bronze is considered susceptible to pitting when the aluminum content is greater than 8%." Since zinc content in brass can be greater than 15% and the aluminum content in aluminum bronze may vary from 4 to 15%, the reviewers would like to know why loss of material is not an applicable aging effect for the bronze, aluminum bronze, and aluminum brass components in the intake cooling water system.

3 3 9-6 Sent to AMP Reviewer

The applicant states that certain intake cooling water system components are replaced on a given frequency based on operating experience. The applicant is requested to identify these components Do these components include intake cooling water pump bodies, and stainless steel expansion joints in Unit 2. If so, then what is the field experience related to these components and at what frequency they are replaced? Does this replacement practice ensure that the degraded components will be replaced before their intended function (i e , pressure boundary) is compromised?

3 3.9-6* Became 3 3 9-3

The applicant relies on detection of leakage for managing loss of material on the inside surface of several components exposed to raw water. The presence of leakage from a component, however, would indicate that the component could not perform its intended function, i e., pressure boundary. Therefore, the applicant is requested to justify why the use of this program alone is adequate for managing loss of material at the inside surface of the components exposed to raw water

3 3 9-7 Sent to AMP Reviewer

The applicant states that the internal linings on piping and other components are visually inspected for degradation What criteria are used to determine which components should be inspected? Do these inspections include inspection of lining on the inside surface of fittings such as elbows? This information is requested because the field experience described in IE Information Notice No 85-24, "Failures of Protective Coatings in Pipes and Heat Exchangers," indicates that the interior protective lining on elbows are more susceptible to degradation than that on straight piping

3.3 9-7* 6/19/02ML021780091

The applicant does not propose use of galvanic corrosion susceptibility inspection program, which is described in Section 3 1 2 of Appendix B to the LRA, for managing loss of material due to galvanic corrosion. The applicant is requested to provide information about whether the components in the intake cooling water system are susceptible to galvanic corrosion and if so, then how the resulting loss of material will be managed?

3 3 9-8* 6/19/02ML021780091

The Intake Cooling Water System Inspection Program provides for visual inspection and examination of accessible surfaces for managing loss of material and cracking The applicant is requested to provide information about whether there are any inaccessible surfaces of the intake cooling water system carbon steel, cast iron and fiberglass components exposed to indoor-not air conditioned or outdoor environment If so, will the program be enhanced to manage aging effects for these inaccessible surfaces during the extended period of operation?

3 4 3 6/21/02ML021780147

Provice justification for excluding aging management revew of feedwater pump casing and blowdown

3 4 7 6/21/02ML021780147

Tables 3 4 1 and 3.5 2 list the aging effects in main steam and FW systems

3 5-11 6/21/02ML021780147

Identifying the functions (column 2) of concrete components in Table 3 5-2

3 5-8 6/21/02ML021780147

With respect to Section 3 5 2.2.1 of the LRA, indicate if the Unit 2 SFP storage racks contain any

3 6 1.1-1* Became 3 6-1

Sections 3 6 1.1 4 of the LRA evaluates the aging effects applicable for electrical components that can be expected to occur due to radiation The applicant states that the DOE Cable Aging Management Guide (AMG), Section 4 1.4, provides a threshold value and a moderate dose for various insulating materials The threshold value is the amount of radiation that causes incipient to mild insulation damage. Once this threshold is exceeded, damage to the insulation increases from mild to moderate to severe as the total dose increases The moderate damage value indicates the value at which the insulating material has been damaged but is still functional. St. Lucie Units 1 and 2 evaluations use the moderate damage dose from the DOE Cable AMG as the limiting radiation value shown in Table 3 6-3 of the LRA The maximum dose shown in Table 3 6-3 includes the maximum 60-year normal exposure inside containment The applicant concludes that because the maximum operating radiation dose to cable insulation will not exceed the moderate damage doses no aging management are required for radiation. Section 3.1.1 5 of the LRA evaluates the aging effects applicable for electrical components due to heat and oxygen. The applicant states that it developed a maximum operating temperature for each insulation type based on cable applications at St Lucie Units 1 and 2. The maximum operating temperature indicated in Table 3 6-4 incorporates a conservative value for self-heating for power applications combined with the maximum design ambient temperature The applicant used the Arrhenius method, as described in EPRI NP-1558, to determine the maximum continuous temperature to which insulation can be exposed so that the material has an indicated "endpoint of 60 years " The applicant concludes that a comparison of the maximum operating temperature to the maximum 60-year continuous use temperature for the various insulation materials indicates that all of the insulation material used in low-and medium-voltage power cables and connections can withstand the maximum operating temperature for at least 60 years

In most areas within a nuclear power plant, the actual ambient environments (e g temperature, radiation, or moisture) are less severe than the nominal plant environment. However, in a limited number of localized areas, the actual environments may be more severe than the nominal plant environment. Conductor insulation materials used in cable and connections may degrade more rapidly than expected in these adverse localized environments and require aging management. The purpose of the aging management program is to provide reasonable assurance that the intended functions of electrical cables and connections exposed to adverse localized environments caused by radiation, heat, or moisture will be maintained to be consistent with the current licensing basis through the period of extended operation

Therefore, for non-EQ cables, connections (connectors, splices, and terminal blocks) within the scope of license renewal located in the containment and the reactor auxiliary building, provide a description of your aging management program for accessible and inaccessible electrical cables and connections exposed to an adverse localized environmental caused by heat, radiation, or moisture.

3 6 1.1-2* Became 3 6-2

Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR) Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in the instrument loop. Visual inspection may not be sufficient to detect aging degradation from heat, radiation, or moisture in the instrumentation circuits with sensitive, low-level signals Because low-level signal instrumentation circuits may operate with signals that are normally in the pico-amp or less, they can be affected by extremely low levels of leakage current. These low levels of leakage current may affect instrument loop accuracy before the adverse localized changes are visually detectable Routine calibration tests performed as part of the plant surveillance test program can be used to identify the potential existence of this aging degradation Provide a description of your aging management program that will be relied upon to detect this aging degradation in sensitive, low-level signal circuits.

4 6 3-1 6/21/02ML021780147

Section 4 6 3 of the LRA dscribes the St Lucie core support barrel repair

4 6 3-2 6/21/02ML021780147

Provide detailed information regarding the design of the expandable plugs and how these are pre-loaded against the core support barrel

4 6.4-1 7/31/02 ML022130182

The staff's criteria for performing plant-specific thermal fatigue crack growth assessments are contained in the in the staff's safety evaluation (SE) on Topical Report No CE NPSD-1198-P, Revision 00, dated February 8, 2002, as stated in Section 2 3.1 and summarized in Section 3 2. Perform a plant-specific thermal fatigue crack growth assessment for the bounding half-nozzle repair implemented at St Lucie Nuclear Station.

If the assessment has not already been performed, the calculational and technical details of this assessment need not be submitted Provide a discussion that demonstrates that either:

(1) the thermal fatigue crack growth analysis calculation provided in Proprietary Calculation A-GEN-PS-0003, Revision 00, "Evaluation of Fatigue Crack Growth Associated with Small Diameter Nozzles in CEOG Plants," and summarized in CEOG Topical Report No CE NPSE-1198-P, Revision 00, is bounding relative to the bounding plant-specific analysis, or

(2) the existing flaw in the nozzle's original J-groove weld metal will be acceptable for continue service over the extended period of operation Consider both the hot-leg piping and pressurizer shell

B.3 1.2-4 7/31/02 ML022130182

On page A2-30 of the LRA, it is stated that this program will be implemented prior to the end of the initial operating license term for St Lucie Unit 2 This implies that one-time inspections of Unit 1 piping could be conducted after its initial license period and could be performed as late as 48 years after initial operations Explain the basis for implementing this program prior to the end of the initial operating license term for St Lucie Unit 2 instead of prior to the end of the license term for St Lucie Unit 1.

B 3 2.13-1 7/31/02 ML022130182

With respect to operating experience, describe the historical and current degradation mechanisms that have occurred in various regions of the tube bundle in the St Lucie, Units 1 and 2, steam generators

B 3 2.13-2 7/31/02 ML022130182

The applicant stated that St. Lucie steam generator integrity program is consistent with the guidance provided in NEI 97-06, "Steam Generator Program Guidelines " The staff believes that the applicant should commit to use the latest version of NEI 97-06

Eight EPRI reports relating to the steam generator tubes are referenced in Appendix A of NEI 97-06. The staff believes that the applicant should commit to use the latest version of the EPRI reports

B 3 2.13-3 7/31/02 ML022130182

The lessons learned from the November 2001 Three Mile Island steam generator (SG) tube rupture due to flow induced vibration (FIV) and the April 2002 Oconee SG tube rupture due to certain degradation mechanisms, indicated that SG Integrity Program may not be able to adequately prevent the SG tube rupture during the plant operation under various SG tube degraded conditions As the SG tubes degrade and result in changes in dynamic characteristics of the SG tubes, the original design analysis for FIV of SG tubes may not be applicable any more for the degraded SG tubes Describe, in detail, how your plant-specific SG Integrity Program will ensure that, although favorable inspection results (within allowable) were obtained, the degraded SG tubes will not be ruptured due to FIV and can still perform its intended functions until the next inspection.

B 3 2 2-1 7/31/02 ML022130182

The applicant states that "The ASME Section XI, Subsections IWB, IWC, and IWD inservice inspection program" will be enhanced to require evaluation of surge line flaws (as identified) with regard to environmentally assisted fatigue and to require VT-1 inspections of the core stabilizing lugs and core support lugs "

How will the surge line flaws be identified? What examination techniques will be used (visual, surface, volumetric)? At what frequency will the surge lines be examined? What areas of the surge lines are going to be examined? What criteria will be used in the evaluation of the identified flaws?

At what frequency will the VT-1 inspections of the core stabilizing lugs and core support lugs be performed? What acceptance criteria will be used?

B 3 2.5 3-1 7/31/02 ML022130182

In Appendix B Section 3 2.5 3 of the LRA, the applicant stated that other ASTM Standards are utilized for fuel oil testing as specified in the St Lucie Units 1 and 2 Technical Specifications The applicant is requested to identify those referred ASTM Standards

B 3.2.5-1 7/31/02 ML022130182

The Chemistry Control Program is credited for aging management of various systems and structures including eight of the auxiliary systems. The program contains three different aging management programs, Water Chemistry Control, Closed-Cycle Cooling Water System Chemistry, and Fuel Oil Chemistry Tables in Section 3 3 of the LRA only refer to Chemistry Control Program rather than the specific subprogram. The applicant is requested to clarify which specific subprogram of the Chemistry Control Program is credited for managing the aging effects for the auxiliary systems included in Table 3.3 of the LRA

B 3.2.9-1 7/31/02 ML022130182

(A) The applicant stated that wall thinning problems have occurred in the main feedwater system, condensate system, extraction steam system, moisture separation reheater, and feedwater heater drain line Clarify whether wall thinning has occurred in these system in the St Lucie units

(B) The applicant stated that the FAC program is credited for main steam, auxiliary steam, turbine, main feedwater, steam generator blowdown, reactor coolant (steam generator nozzles) at St Lucie. Clarify why the condensate systems, extraction steam line, moisture separation reheater, and feedwater heater drains discussed above are not considered in St. Lucie's FAC program

(C) Describe the process of selecting piping systems to be included in or deleted from the FAC program

B 3.2 9-2 7/31/02 ML022130182

(A) The applicant stated that the FAC program has been an ongoing program at St. Lucie since the 1980's Since 1996, the applicant has replaced a small number of components due to FAC Clarify whether the piping component replacement since 1996 has been motivated by the findings of the FAC program or by inspection findings other than the FAC program (e g , operational leakage or routine maintenance)

(B) Discuss whether wall thinning in piping components had been detected by the FAC program from 1980's to 1996

B 3 2.9-3 7/31/02 ML022130182

In the last paragraph on page B-41 of the LRA, the applicant mentioned an enhanced FAC program The applicant stated that the FAC program will be enhanced to include small bore piping associated with selected steam traps and drain line Discuss the rationale of this enhancement.

B3.2 2 2-1 6/21/02ML021780147

The staff considers the GALL program X1.s1 as the containment condition monitoring program,

B3 2 2.2-2 6/21/02ML021780147

Subsection IWE of Section XI of the ASME Code does not provide acceptance criterion for the extent of corrosion of the containment shell

B3 2 8 2 6/21/02ML021780147

It is sted in Section B 3 2 8, "Preventive Actions," of the LRA that Mechnaical Fire Protection System components

B3 2 8-1 6/21/02ML021780147

In accordance with the GALL Report (NUREG 1801, Chapter XI.M26, M27), the scope of Fire Protection Program

LRAItemNumber	*CrossReference*
	Item
2 1 - 1	2.1 - 1

By letters dated December 3, 2001, and March 15, 2002, the staff issued interim staff guidance to the Nuclear Energy Institute (NEI) The described areas to be considered and options the staff expects licensees to use to determine what systems, structures, or components (SSCs) meet the criterion defined in Title 10, Section 54 4(a)(2), of the Code of Federal Regulations 10 (CFR 54 4(a)(2)) (i e., all non-safety-related SSCs of which failure could prevent satisfactory accomplishment of any safety-related functions identified in paragraphs (a)(1)(i), (ii), or (iii) of that section)

The staff's letter dated December 3, 2001, provided specific examples of operating experience that identified pipe failure events (summarized in Information Notice 2001-09, Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized-Water Reactor") and the approaches that the staff considers acceptable to determine which piping systems should be included within the scope of license renewal based on the criterion defined in 10 CFR 54 4(a)(2)

The staff's letter dated March 15, 2002, further described the staff's expectations regarding the evaluation of non-piping SSCs to determine which additional non-safety-related SSCs are within the scope of license renewal The staff position states that applicants should not consider hypothetical failures, but should base their evaluations on each plant's current licensing basis, engineering judgement and analyses, and relevant operating experience The letter further describes operating experience as all documented plant-specific and industry-wide experience that can be used to determine the plausibility of a failure Documentation would include the NRC's generic communications and event reports, plant-specific condition reports, industry reports such as significant operating experience reports (SOER's) and engineering evaluations

Consistent with the staff position described in the aforementioned letters, please describe the scoping methodology that you have implemented for the evaluation of the criterion defined in 10 CFR 54 4(a)(2) As part of your response, please indicate the option(s) credited, list the 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

2 1 - 2 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.

2.1 - 3 2.1 - 1

During the audit of the St Lucie scoping and screening methodology, the staff reviewed the applicant's programs described in Appendix A, "Updated FSAR Supplement," and Appendix B, "Aging Management Programs." The purpose of this review was to ensure that the applicant's aging management activities are consistent with the staff's guidance described in Section A 2, "Quality Assurance for Aging Management Programs (Branch Technical Position IQMB-1)," of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants "

Based on the staff's evaluation, the description and applicability of the aging management programs and their associated attributes to all safety-related and non-safety-related structures and components provided in Appendix B of the license renewal application (LRA) are consistent with the staff's position regarding quality assurance for aging management. However, the applicant has not sufficiently described the use of the quality assurance program and its associated attributes in the updated Final Safety Analysis Report (UFSAR) supplement discussion provided in Appendix A to the LRA The staff requests that the applicant revise the description in the updated FSAR supplement, Chapter 18 0, "Aging Management Programs and Time-Limited Aging Analyses Activities," to include aspects of the quality assurance program consistent with the description provided in Appendix B to the LRA.

2 2 - 1 2.2-3

The NRC staff is unable to find descriptions of the air blower or sluice water in the updated final safety analysis reports (UFSARs) Table 2 2-1 of the LRA lists these systems as not being within the scope of license renewal As such, the staff is unable to determine with reasonable assurance that these systems do not have intended functions that meet the criteria of Title 10, Section 54.4, of the Code of Federal Regulations (10 CFR 54 4) Provide a reference to the UFSAR section that describes these systems, or provide a summary description of their intended functions.

2 2 - 2 2.2 - 1

Table 2 2-1 of the LRA does not include miscellaneous drains. On the basis of the plant internal flood analysis, documented in the Unit 1 and 2 Updated Final Safety Analysis Reports (UFSARs), it appears that the drain systems for many of the in-scope structures provide a flood protection barrier that supports the capability to shut down the reactor and maintain it in a safe shutdown condition Degradation of these systems, such as blockage due to foreign material concentration or excessive corrosion, could invalidate the flooding analysis and prevent satisfactory accomplishment of the intended function of safety-related systems Therefore, major portions of the plant/building drain system should be within the scope of license renewal and subject to an aging management review (AMR) per 10 CFR 54 4(a)(ii)

Examples of flooding analyses for Unit 2, which take credit for floor drains include

ÿ Break in the diesel generator building, page 3 6F-7.

ÿ Break in the component cooling water building, page 3 6F-7.

Justify why these drain systems are considered to be outside the scope of license renewal or are not subject to an AMR

2 3 1 - 1 2 3 1 - 1

The UFSARs for St Lucie indicate that Units 1 and 2 are required to be in cold shutdown following some postulated fire events However, the applicant states on page 3.1-11 of the LRA that the pressurizer spray heads do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54 4 and, therefore, are not within the scope of license renewal. The staff requests that the applicant explain whether the components, which spray water inside the pressurizer to condense steam (auxiliary spray), are relied upon to take the units to cold shutdown following the postulated fire events. Also consider postulated SBO events that require the Units to be in cold shutdown

2 3 1 - 2 2 3 1-2

The applicant states on page 3 1-11 of the LRA that pressurizer thermal sleeves do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54 4 and, therefore, are not within the scope of license renewal. The applicant further states that the thermal sleeves are not part of the pressure boundary, but do provide thermal shielding to the surge and spray nozzles of the pressurizer to minimize fatigue for those nozzles, which might otherwise result from thermal cycles Fatigue has been identified as an aging effect requiring a time-limited aging analysis (TLAA), and is analytically addressed in section 4 3 1 of the LRA. The staff concludes that since the thermal sleeves were credited in the TLAA for the nozzles (pressure boundary), they should require an aging management program Operable thermal sleeves are relied upon to allow the nozzles to perform their intended safety functions during the extended period of operation and, therefore, the thermal sleeves should be within the scope of license renewal, pursuant to 10 CFR 54 4(a)(2) Furthermore, the Westinghouse Owners Group has committed in topical report WCAP-14574-A, "License Renewal Evaluation· Aging Management Evaluation for Pressurizers," and the staff has concurred that the pressurizer surge nozzle and the spray nozzle thermal sleeves should require an aging management review.

The staff requests that the applicant perform an aging management review of the subject components, or justify why one is not required.

2.3 1 - 3 2 3 1-3

In Section 3 1.3 of the LRA, the applicant states that reactor vessel flange leak detection lines do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. On the basis of the staff's experience with license renewal, the staff has generally concluded that the inner O-ring, the leakoff lines, and the outer O-ring all support the reactor vessel closure head flange pressure boundary. See the letter dated October 27, 1999, from C I. Grimes of the NRC to D J. Firth of the Babcock & Wilcox Owner's Group In general, the leakoff lines require an aging management review. Please provide a site-specific technical justification for St Lucie as to why aging management is not required, or perform an aging management review of these components

2.3 2 - 1 2 3 2-1

During the injection mode for a small break loss-of-coolant accident, a portion of the high pressure safety injection (HPSI) flow is returned to the refueling water tank (RWT) through the bypass line A section of the bypass line (1-SI-02, location A7, and 2-SI-02, location B4) near the RWT is non-safety-related, and the LRA shows that it is not within the scope of license renewal If this piping fails and flow is not returned to the RWT, the inventory of the tank could be prematurely exhausted. For both units, there are orifices in the bypass lines which restrict the maximum bypass flow The Unit 1 bypass flow is 30 gpm per pump (per Table 6 3-2 of the Unit 1 UFSAR) for operation at rated HPSI flow No specific bypass flow rate could be identified in the Unit 2 UFSAR. For breaks of sufficiently small size, the bypass flow can continue to leak out for a long period of time, potentially exhausting the supply of coolant from the RWT. The failure of the non-safety-related piping in the bypass line could prevent satisfactory accomplishment of the safety-related intended function of the HPSI system Justify why the piping and valve body components in the bypass piping to the RWT are not within the scope of license renewal and subject to an aging management review.

2 3 2 - 2 2.3 2 1-1

The diagrams of the containment cooling system provided in drawings 1-HVAC-01 and 2-HVAC-02 for Units 1 and 2, respectively, are not sufficiently detailed for the staff to determine the intended system boundaries for license renewal For example, these drawings do not show whether the applicant considered the duct riser and ring header to be within the scope of license renewal The notation "to ring header" shown on the downstream side of the containment coolers does not clearly show what components are within the scope of license renewal On page 6.2-36 of the UFSAR for Unit 2 the applicant states that blowout panels are provided on the duct risers between the fan coolers and ring header to attenuate high-pressure transmission from inside the secondary shield wall through the duct Similar blowout panels are also described as components of the containment cooling system on page 6.2-50 of the UFSAR for Unit 1. However, blowout panels are not specifically identified as a component or commodity group in Table 3.2-1 of the LRA

Clarify whether all appropriate containment cooling system components are included within the scope of license renewal and subject to an aging management review, and identify the components and commodity groups that include the ring ducts, risers, and blowout panels If only a portion of the component cooling water system is within the scope of license renewal and subject to an aging management review, identify the boundary between the in-scope and out-of-scope portions by providing additional textual description, drawings, and/or references (such as designed-basis documents) to supplement the LRA and drawings already provided.

2.3 2 - 3 2 3 2 3-1

The containment isolation system comprises those portions of the containment purge, hydrogen purge (Unit 1), continuous containment/hydrogen purge (Unit 2), service air and containment vacuum relief that have a containment pressure boundary intended function. The Unit 2 containment vacuum relief system air accumulators are shown on license renewal drawing 2-HVAC-01 at location B7 as being within the scope of license renewal These components are listed in Table 3 3-8 as belonging to the instrument air system. However, LRA Table 2.3-3 does not list drawing 2-HVAC-01 as showing portions of the instrument air system. Justify why these air accumulators are not within the scope of license renewal and subject to an aging management review.

2.3 2 - 4 2 3 2 1 -1

On page 6 2-36 of the Unit 2 UFSAR, the applicant states that "blowout panels are provided on the duct risers between the fan coolers and ring header to attenuate high-pressure transmission from inside the secondary shield wall through the duct " Similar blowout panels are also described as components of the containment cooling system on page 6 2-50 of the Unit 1 UFSAR. However, blowout panels are not identified as a component or commodity group in Table 3 2-1 of the LRA The staff believes that the blowout panels perform a safety-related intended function and, as such, should be within the scope of license renewal and subject to an aging management review (AMR) Justify why the blowout panels are considered to be outside the scope of license renewal or are not subject to an AMR.

2.3 2 - 5 2.3 2.1 - 2

Figure 6 2-46 of the Unit 1 UFSAR shows drum-type air outlets (at numerous locations) as components of the containment cooling system, but these outlets were neither identified in LRA Table 3 2-1 nor shown on license renewal boundary drawing 1-HVAC-01. It appears that these components are passive and long-lived and, as such, should be within the scope of license renewal and subject to an AMR Justify why these components are considered to be outside the scope of license or are not subject to an AMR.

2 3 2 - 6 2.3 2.1 - 2

Figure 6.2-46 of the UFSARs for Units 1 and 2 shows gravity dampers (at numerous locations) as components of the containment cooling system The housings for these components were neither identified in LRA Table 3 2-1 nor shown on license renewal boundary drawings 1-HVAC-01 and 2-HVAC-01. It appears that these component housings are passive and long-lived and, as such, should be within the scope of license renewal and subject to an AMR Justify why the gravity dampers are considered to be outside the scope of license or are not subject to an AMR

2 3 3 - 1 2 3.3 2 - 2

Unit 1 license renewal boundary drawing 1-CCW-01 shows connections to temporary air conditioning chillers at four locations (D1, C1, C2, and C3) These chillers are shown as not being within the scope of license renewal, however, two of them are connected to essential loop A and two are connected to essential loop B These chillers and their intended functions are not described in Section 9 2 2 of the Unit 1 UFSAR, which discusses the component cooling water system. Therefore, the staff is unable to verify that these chillers do not have an intended function that would meet the requirements of 10 CFR 50 54(a) Justify why these components are considered to be outside the scope of license renewal or are not subject to an AMR

2 3 3 - 10 2 3 3 9 - 5

In LRA Section 2 4 2.10, "Intake Structures," the applicant states that water enters each intake structure through four submerged openings and passes through the stationary and traveling screens before entering the rear of the intake structure where the pumps are located It appears that these screens perform an intended function by preventing debris and organisms from reaching and causing the failure of the safety-related intake cooling water pumps and strainers As such, these screens would be within the scope of license renewal and subject to an AMR The staff was unable to locate these components either in LRA Table 3 3-9 for the intake cooling water system, or in Table 3 5-11 for the intake structure. Justify why the traveling screens are considered to be outside the scope of license renewal or are not subject to an AMR

2.3 3 - 11 2.3 3.10 - 1

The miscellaneous bulk gas supply (MBGS) system is common to both Units 1 and 2. In Section 2.3.3 10 of the LRA, the applicant states that portions of the MBGS system are within the scope of license renewal Table 3 3-10 of the LRA identifies those MBGS system structures and components that are within the scope of license renewal and subject to an AMR. However, because of the limited description of the MBGS system provided in Section 9 3.1 of the Unit 1 UFSAR, the staff is unable to determine, with reasonable assurance, that the applicant has correctly identified the components that are within the scope of license renewal The staff is also unable to identify which of the components shown on the four license renewal boundary drawings referenced in Table 2 3-3 (1-SAMP-02, 2-SAMP-03, 2-CS-01, and 2-IA-05) belong to the MBGS system and whether other components not shown on any of the referenced drawings are required for the system to perform its intended function.

2.3 3 - 12 2 3 3 11 - 2

The boundary of the portion of the primary makeup water system that is within the scope of license renewal ends at valves that are shown as normally open (see license renewal boundary drawing 2-PW-01 at locations H4 and H5) Failure of the downstream piping may affect the pressure boundary intended function In LRA Section 2.3 3.11, "Primary Makeup Water," the applicant states that this approach is acceptable because Unit 2 primary makeup water is only required in the event of a fire in the Unit 2 containment or Unit 2 fuel handling building, and the open boundary valves are closed for these fire scenarios.

Provide additional information to support the basis for this determination For example, discuss the steps in the fire procedures for closing the valves, the amount of time required to complete these steps, and the availability of sufficient water inventory if the valves are not closed

2.3 3 - 13 2 3.3 14 - 1

On license renewal boundary drawing 1-TCW-01, the licensee indicates the components that are within the scope of license renewal However, Table 3.3-14 of the LRA does not include all of these components Justify why the following components are excluded from Table 3 3-14

• Instrument air aftercoolers shown on license renewal boundary drawing 1-TCW-01 at locations A4, C4, and D4

• Jackets for the service air compressor shown at location B4 on drawing 1-TCW-01

• Instrument air compressors 1A and 1B shown at locations B4 and D4 on drawing 1-TCW-01

If these components were included in Table 3.3-14 under the category of "piping/fittings," clarify why Table 3.3-14 does not list a heat transfer intended function for these components

2.3 3 - 14 2 3 3 14 - 2

Clarify the intended support function of the Unit 1 turbine cooling water system that led to the determination that only the Unit 1 turbine cooling water system is within the scope of license renewal Confirm that the Unit 2 turbine cooling water system does not perform a similar intended function

2 3 3 - 15 2.3 3 6 - 4

The license renewal rule, 10 CFR 50 54(a)(3), requires an applicant to include those structures, systems, and components (SSCs) that are relied on in a safety analysis or plant evaluation to perform a function which demonstrates compliance with 10 CFR 50.48, "Fire protection," to be included within the scope of the license. In general, operating licenses contain a license condition for fire protection that defines the 10 CFR 50 48 fire protection program The license condition states that the licensee "shall implement and maintain in effect the provisions of the approved fire protection program" as described in the UFSAR and/or as approved in a safety analysis

Comparing the applicable information contained in the LRA with the UFSAR, the staff identified SSCs in the UFSAR that were not included within the scope of license renewal. A sampling review by staff has identified the hydropneumatic tank and appurtenances (provides pressure maintenance for fire water system), and nitrogen tank for gaseous suppression system (pilot pressure for system actuation) that are included in the safety analysis, yet were not identified to be within the scope of license renewal

Clarify the current licencing basis, consistent with 10 CFR 50 48, with respect to scoping for license renewal Using the examples above, justify why SSCs listed in the UFSAR are considered to be outside the scope of license renewal

2.3 3 - 2 2 3 3 4 - 1

Table 3 3-4 of the LRA does not list certain diesel generator and support system components and their housings, which are identified below. Although the license renewal boundary drawings, which are cited below, identify them as being within the scope of license renewal It appears that these components are passive and long-lived and, as such, should be within the scope of license renewal and subject to an aging management review Justify why these components are excluded from Table 3 3-4.

The fuel oil system components that were omitted are the duplex strainers at location B4 of drawings 1-EDG-03 and 1-EDG-06, and at location G4 of drawings 1-EDG-02 and 1-EDG-05

The lube oil system components and housings that were omitted are as follows·

• Immersion heaters at location C3 of drawings 1-EDG-02 and 1-EDG-05, location E5 of drawings 1-EDG-03 and 1-EDG-06, locations D6 and E5 of drawings 2-EDG-02 and 2-EDG-05, and locations D3 and E2 of drawings 2-EDG-03 and 2-EDG-06

• Y-strainers and a lube oil strainer at locations B4 and D5 of drawings 1-EDG-02 and 1-EDG-05, locations D3 and G4 of drawings 1-EDG-03 and 1-EDG-06, locations D3 and H3 of drawings 2-EDG-02 and 2-EDG-05, and locations C3 and E4 of drawings 2-EDG-03 and 2-EDG-06

2.3 3 - 3 2 3.3 6 - 5

The NRC staff is unable to identify the suppression systems for the cable spreading rooms (Unit 1-Halon 1301 and Unit 2-Preaction System) on the license renewal boundary drawings Identify where these suppression systems are on a drawing or provide a description of the systems

2.3 3 - 4 2 3.3 7 - 2

The spent fuel pool cooling systems are acceptable, based in part on the diversity of makeup water sources to the spent fuel pool. At Unit 1, the makeup water sources include the refueling water storage tank and three other water storage tanks. At Unit 2, makeup to the fuel pool is also provided from the refueling water tank via the refueling water pool purification pump and piping The Unit 1 and 2 UFSARs reference multiple makeup sources, however, license renewal boundary drawings 1-SFP-01 and 2-SFP-01do not show the piping and valves associated with the makeup line from the refueling water storage tanks to be within the scope of license renewal The refueling water storage tanks are within the scope of license renewal Justify why the piping and valves are considered to be outside the scope of license renewal or are not subject to an AMR.

2.3 3 - 5 2 3 3.8 - 1

Table 3.3-8 of the LRA does not list certain instrument air system components and/or their housings, which are identified below. Although the license renewal boundary drawings, which are cited below, identify them as being within the scope of license renewal. It appears that these components are passive and long-lived and, as such, should be within the scope of license renewal and subject to an AMR. Justify why these components are excluded from Table 3 3-8

- Oil/water separator (at location F6 of drawing 1-IA-06)
- Moisture separators (at locations C3 and E3 of drawing 1-IA-06, and locations B3 and D3 of drawing 2-IA-04)
- Oil coolers (at locations F2 and H2 of drawing 2-IA-04)

2.3 3 - 6 2.3 3 8 - 2

License renewal boundary drawing 1-IA-06 indicates that the Unit 1 instrument air dryers and associated equipment are within the scope of license renewal. However, drawing 2-IA-04 indicates that the Unit 2 instrument air dryers are outside the scope of license renewal.

In Section 9 3 1 of the Unit 1 and 2 UFSARs, the applicant discusses the ability to cross-connect the Unit 1 and Unit 2 instrument and station air systems On the basis of the information provided, the staff cannot determine, with reasonable assurance, that the instrument air dryers for Unit 2 should not be within the scope of license renewal and subject to an AMR. Justify why the Unit 2 instrument air dryers are considered to be outside the scope of license renewal or are not subject to an AMR

2.3 3 - 7 2 3 3 8 - 3

In Section 9 3.1.2 of the Unit 1 and 2 UFSARs, the applicant states that each unit has four air compressors At both units, air compressors 1C and 1D are each capable of full-load capacity and are used for normal operation, while air compressors 1A and 1B have only a partial-load capacity. On license renewal boundary drawing 2-IA-04 at locations F2 and H2, the applicant indicates that the Unit 2 instrument air compressors 2C and 2D are within the scope of license renewal On drawing 1-IA-06 at locations F2 and H2, the applicant indicates that the Unit 1 instrument air compressors 1C and 1D are outside the scope of license renewal. On the basis of the information provided, the staff cannot determine, with reasonable assurance, whether all four air compressors for Unit 1 should be within the scope of license renewal and subject to an AMR Justify why two of the Unit 1 air compressors are considered to be outside the scope of license renewal or are not subject to an AMR

2 3 3 - 8 2 3 3 8 - 4

The boundary of the portion of the instrument air system that is within the scope of license renewal ends at valves that are shown as normally open (see license renewal boundary drawing 1-IA-03 at locations C5, C7, D5, and H6; drawing 1-IA-05 at locations A2 and A5, and drawing 2-IA-04 at location C5) Failure of the downstream piping may affect the pressure boundary intended function In Section 2 3 3 8 of the LRA, the applicant states that this approach is acceptable because sufficient time exists to close the open valves for the station blackout and fire scenarios for which this system is needed

Provide additional information to support the basis for this determination For example, discuss the steps in the station blackout and fire procedures for closing the valves, the amount of time required to complete these steps, and the availability of sufficient air inventory if the valves are not closed

2 3 3 - 9 2 3 3 9 - 1

In Section 2 3 3 9 of the LRA, the applicant states that the intake cooling water system provides a safety-related makeup source for spent fuel pool cooling It appears that the temporary hoses shown at location D7 on license renewal boundary drawings 1-ICW-01 and 2-ICW-01 for Units 1 and 2, respectively, are required to perform this spent fuel pool makeup intended function and, therefore, are within the scope of license renewal Furthermore, it appears that these components are passive and long-lived and, therefore, should be subject to an AMR However, these components are not listed in Table 3 3-9 of the LRA. Justify why the temporary hoses are excluded from Table 3 3-9 of the LRA

2.3 3.15 - 1 2 3 3.15 - 4 to 16

The ventilation system license renewal boundary drawings, which are identified below, show damper components for both Units 1 and 2, however, LRA Table 3 3-15 does not identify the housings for these dampers It appears that these component housings are passive and long-lived and, as such, should be within the scope of license renewal and subject to an AMR Justify why these components are considered to be outside the scope of license renewal or are not subject to an AMR

• Unit 1 on license renewal boundary drawing 1-HVAC-01, Rev. 0

— Hot shutdown panel housing for fans HVS-9 and HVE-35 at locations E7 and D7

— Unlabeled damper housing at locations E7

• Unit 1 on license renewal boundary drawing 1-HVAC-02, Rev. 0

— Control room cooling system damper housings D-17 at location B5, D-18 at location B6, D-19 at location C6, GD-5 at location B6, GD-6 at location C6, D-20 at location A7, D-21 at location B7, D-22 at location C7, GD-7 at location A8, GD-8 at location B8, GD-9 at location C8, D-29A at location C4, D-29B at location C5, D-41 at location C8, D-42 at location C7, and unlabeled at locations C8 and D8

2 3 3.15 - 2 2 3 3.15 - 4 to 16

The ventilation systems license renewal boundary drawings, which are identified below, show system filters for both Units 1 and 2, however, LRA Table 3 3-15 does not identify the media for these filters. It appears that these system filters are passive and may be long-lived Identify whether the media for these system filters was excluded from the scope of license renewal on the basis that these media components are periodically replaced and, if so, identify the replacement interval

If the filter media was excluded because it is routinely replaced on condition, describe the plant-specific monitoring program and the specific performance standards and criteria for replacement. If neither of those replacement conditions apply, justify why the filter media is considered to be outside the scope of license renewal or are not subject to an AMR

Unit 1, on license renewal boundary drawing 1-HVAC-01, Rev. 0, media for the miscellaneous ventilation filters at locations E7.

• Unit 1 on license renewal boundary drawing 1-HVAC-02, Rev 0

— Control room cooling system filter media for HVAC units HVA-3A, 3B, and 3C at locations A7, B7, and C7

— Control room cooling system high-efficiency particulate air (HEPA) filter media and charcoal adsorber media for HVAC units HVE-13A and 13B at location B5

2 3.3 15 - 3 2.3 3 15 - 4 to 16

Table 3 3-15 of the LRA does not list certain components, which are listed below, although the components are shown on the license renewal boundary drawings (cited below) as being within the scope of license renewal Justify why these components are excluded from Table 3 3-15

• Unit 1 on license renewal boundary drawing 1-HVAC-01, Rev 0 a screen for the hot shutdown panel ventilation outside air inlet at location E7

• Unit 1 on license renewal boundary drawing 1-HVAC-02, Rev 0

— Direct expansion cooling coils and coil housings for indoor HVAC units HVA-3A, 3B, and 3C, at locations A7, B7, and C7

— Technical support center exhaust damper EHC-1 at location D7 and EHC-2 at location D8

— Shield building ventilation system electrical heating coils and housings EHC-HVE-6BZ and EHC-HVE-6AI at location D6, and EHC-HVE-6AZ and EHC-HVE-6BI at location F6

— Shield building ventilation system demister housings at locations D6 and F6

2.3 3 15 - 4 2 3 3.15 - 1

Many of the symbols used for HVAC system components in license renewal boundary drawings 1-HVAC-01, 2-HVAC-01, 1-HVAC-02, 2-HVAC-02, and 2-HVAC- 03 are not defined on the "General Notes and Legend" Drawings 1-NOTES-01 and 2-NOTES-01. Clarify the notes and legend drawing(s) that define ECCS ventilation exhaust system components and housings downstream of the exhaust fans HVE-9A and HVE-9B at locations D-5 and E-5 on drawing 1-HVAC-02.

2 3 3 15 - 5 2 3 3 15 - 2

In order to comply with the requirements of General Design Criterion (GDC) 19, as specified in Appendix A to 10 CFR Part 50, a control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions including loss-of-coolant accidents Typically, a main control room envelope (MCRE) is established to maintain habitable environment within which main control room operators can take actions to operate the nuclear power unit safely.

Describe the areas that constitute the MCRE for St. Lucie Units 1 and 2. Verify that all control room ventilation system components inside and/or outside the MCRE that are relied on to perform safety-related functions, are identified as being within the scope of license renewal and subject to an AMR These system components should include, but not be limited to, the housings of air filtration unit components including demisters; heaters, prefilters, HEPA filters and adsorbers, housings of air handling units and fan coil units, housings of fire dampers and control dampers, housings of air intakes and louvers, and housings of exhaust fans and associated supply, return, and exhaust ductwork. Justify why any of these components are considered to be outside the scope of license renewal or are not subject to an AMR

2.3 3.15 - 6 2 3 3.15 - 11

In Section 2.3 3 15 of the LRA, the applicant states that the miscellaneous ventilation system provides ventilation for the Unit 1 computer room and the Unit 1 hot shutdown panel room However, the license renewal boundary drawings do not show a separate ventilation system for the computer room. For example, drawing 1-HVAC-02 (at locations C8 and D8) shows a ventilation supply line to the Unit 1 computer room from the Unit 1 control room ventilation system Clarify why computer room ventilation is considered to be a separate subsystem under miscellaneous ventilation.

2 3 3 15 - 7 2 3 3 15 - 5

License renewal boundary drawing 1-HVAC-02, Rev 0, does not identify the components and/or housings, which are listed below, as being within the scope of license renewal, although these components and/or housings support the intended function of the control room ventilation system to comply with the requirements of GDC 19, as specified in Appendix A to 10 CFR Part 50. Justify why the following components and housings are considered to be outside the scope of license renewal and not subject to an AMR

• Piping, valves, and flexible connections that comprise the refrigerant lines to and from the outdoor air conditioning compressor unit ACC-3A at location A7 to the indoor air conditioner unit HVAC-3A at location A7

• Piping, valves, and flexible connections that comprise the refrigerant lines to and from the outdoor air conditioning compressor unit ACC-3B at location B7 to the indoor air conditioner unit HVAC-3B at location B7

• Piping, valves, and flexible connections that comprise the refrigerant lines to and from the outdoor air conditioning compressor unit ACC-3C at location C7 to the indoor air conditioner unit HVAC-3C at location C7

2 3 3.15 - 8 2.3 3 15 - 8B

In Section 2.3 3 15 of the LRA, the applicant does not provide a system description for the Unit 1 fuel handling building ventilation system and does not include the associated structures and components in either Table 2 3-3 or Table 3 3-15 of the LRA Justify why the Unit 1 fuel handling building ventilation system structures and components are considered to be outside the scope of license renewal or are not subject to an AMR

2 3.3.15 - 9 2.3 3 15 - 12

In Section 2 3 3.15 of the LRA, the applicant does not identify the ventilation system that supports and cools the Unit 2 hot shutdown panel and computer room. Identify system and clarify whether it is within the scope of license renewal and subject to an AMR.

If applicable, provide drawing(s) showing the ventilation structures and components for the Unit 2 hot shutdown panel and computer room Justify why these structures and components are considered to be outside the scope of license renewal or are not subject to an AMR

2 3 4 - 1 2 3 4 1 - 1

In Table 3 4-1 of the LRA, the applicant does not list certain components of the main steam, auxiliary steam, and turbine system, although license renewal boundary drawings identify them as being within the scope of license renewal In particular, it appears that flexible connections SZ-08-1A1, SZ-08-1A2, SZ-08-1B1, and SZ-08-1B2, which are shown on drawing 1-MS-04 at locations D3 and H3, are passive and long-lived and, as such, should be subject to an AMR Justify why the flexible connections are considered to be outside the scope of license renewal or are not subject to an AMR

2 3 4 - 2 2 3 4.1 - 3

The boundary of the portion of the main steam system that is within the scope of license renewal ends at valves that appear to be normally open (see drawing 1-MS-02 at locations B1, B2, F4, F5, F6, and F7, drawing 1-MS-03 at location H5; and drawing 2-MS-02 at locations B1, B2, F4, F5, F6, and F7) Failure of the downstream piping may affect the pressure boundary intended function. In Section 2 3 4 1 of the LRA, the applicant states that this approach is acceptable because the open main steam boundary valves are only required to mitigate potential spurious valve operation in the unlikely event of certain fires, and these open boundary valves are procedurally closed for these fire scenarios

Provide additional information to support the basis for this determination. For example, discuss the steps in the fire procedures for closing the valves, the amount of time required to complete these steps, and the availability of sufficient water inventory if the valves are not closed

2 3 4 - 3 2 3 4 2 - 2

In Table 3 4-2 of the LRA, the applicant includes the main feedwater isolation valve accumulators (hydraulic and pneumatic end only) for Unit 2, but does not include similar components for Unit 1. On drawing 1-FW-02, the applicant indicates that the accumulators for Unit 1 are within the scope of license renewal Explain why the Unit 1 accumulators did not receive an AMR.

2.3 4 - 4 2 3 4 3 - 1

On license renewal boundary drawings 1-AFW-01 and 2-AFW-0, the applicant indicates that piping from the condensate storage tank (at location D7) connects below the normal water level The applicant does not indicate that this piping is within the scope of license renewal This piping appears to connect the lower portion of the condensate storage tank with the condenser hotwell Failure of this piping may compromise the pressure boundary intended function of the condensate storage tank. Justify why this piping is considered to be outside the scope of license renewal or are not subject to an AMR

2 4 1 - 1 2.4 1 1.1-1

A manway is shown on the top of the steel containment structure at location B5 on general arrangement drawings 8770-G-067 (Unit 1 UFSAR, Figure 1.2-10) and 2998-G-067 (Unit 2 UFSAR, Figure 1.2-10). However, this manway and associated closure bolting and gaskets are not listed in LRA Table 3 5-2 These components appear to form a portion of the containment pressure boundary Justify why these components are not within the scope of license renewal and subject to an aging management review.

2 4 1 - 2 2 4 1.1.1-2

In LRA Table 3.5-2, the applicant states that the containment vessel moisture barrier component/commodity group as being made of elastomer (see page 3 5-44) The intended function of this component/commodity group is described as "Provide shelter/protection to safety-related components (including radiation shielding) " Containment vessel moisture barriers and elastomers are also discussed in Sections 3.5 1 4 and 3 5 1 4.1 of the LRA, respectively.

However, a material identified as Ethafoam is shown between the containment vessel and concrete in general arrangement drawings 8770-G-067 (Unit 1 UFSAR, Figure 1 2-10) and 2998-G-067 (Unit 2 UFSAR, Figure 1.2-10) at locations K1, K10, and I15 on both drawings. Ethafoam is a trademark of the Dow Chemical Company for a polyethylene foam product. Explain why Ethafoam components are not within the scope of license renewal and subject to an aging management review

2.4 1 - 3 2.4 1.1.4-1

In Section 2 4 1.1.4 of the LRA, the applicant states that two equipment hatches are provided for each containment vessel, a construction hatch and a maintenance hatch. Later in this section it states that two personnel airlocks are provided for each containment vessel LRA Section 3 5 1 1 (on page 3 5-2) and Table 3.5-2 (on page 3 5-37) list maintenance, personnel and escape hatches Outside doors for maintenance hatches are also mentioned However, construction hatches are not explicitly mentioned.

The escape hatches are listed as being in the scope of licensing renewal and subject to an aging management review in Section 3.5 1.1 and Table 3-5-2 of the LRA Explain why the hatches are not identified in either Section 2 4 1.1 4 or elsewhere in Section 2 of the LRA

The construction hatch is listed as being in the scope of licensing renewal and subject to an aging management review in Section 2 4 1.1.4 of the LRA Explain why the hatch is not identified in Section 3.5 1.1 and Table 3 5-2 of the LRA

2 4 1 - 4 2.4 1.2-1

In Section 2 4 1.2 of the LRA, the applicant states that "the steel Containment Vessel is supported on fill concrete that transfers the loads by bearing to the base slab " The description of the reinforced concrete below groundwater component/commodity group (exterior walls and foundation) provided in Table 3.5-2 (on page 3 5-43) would apply to the base slab. However, it is not clear if this description also applies to fill concrete above the base slab The fill concrete provides structural support to the containment vessel and, as such, should be within the scope of license renewal and subject to an aging management review. Please indicate whether the fill concrete is within the scope of license renewal and subject to an aging management review, or justify its exclusion

2.4 1 - 5 2.4 1.3-1

In Section 2.4 1.3 of the LRA, the applicant states that the interior structures of each containment vessel and reactor containment shield building consist of concrete and steel components. However, thermal insulation is present on major reactor, pipe, and valve components; pipe and equipment component supports; and structural enclosures and panels used to shelter instruments and electrical equipment No insulation material is shown as being within the scope of license renewal in Table 3 5-2 of the LRA The temperature control intended function provided by insulating materials is important for environmental qualification, as piping and components with degraded insulation will experience additional heat loads and condensation Justify why insulation is not included in the scope of license renewal and subject to an aging management review.

2.4 1 - 6 2.4.1.3-2

In Section 2.3.3 15 of the LRA, the applicant states that the vent stacks are components of the shield building ventilation systems These components are not considered as being within the scope of license renewal and subject to an aging management review, for the reasons stated below.

on page 2 3-26 of the LRA

"... considering St. Lucie Units 1 and 2 accident analyses assume ground level releases, the plant vent stacks do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal."

on page 2.1-4 of the LRA:

"The offsite dose analyses indicate that the radiological consequences of these design basis events, except for the Unit 2 fuel handling accident, represent a small fraction of the 10 CFR Part 100 limits As a result, SSCs related to the prevention and/or mitigation of these design basis events do not meet the scoping criteria of 10 CFR 54.4(a)(1)(iii). This equipment will still be evaluated relative to the scoping criteria of 10 CFR 54 4(a)(2) and 10 CFR 54.4(a)(3) "

However, the vent stacks are not addressed as structures in the Section 2 4 of the LRA. The vent stacks for both units are shown on the enlarged site plot plan drawing 2998-G-059 (Figure 1.2-2 of both the Unit 1 and Unit 2 UFSARs) at location G7 for Unit 1 and location G10 for Unit 2. The vent stack for Unit 1 is also shown in drawing 8770-G-067 at locations C11 through H11. It appears that approximately 140 feet of this component/structure, with an outer diameter of 6 feet, runs parallel to and is supported by the shield building structure, and sits on top of the penetration area of the reactor auxiliary building

The vent stacks should be within the scope of license renewal and subject to an aging management review for three reasons:

(1) The vent stacks are substantial structures in close proximity to the shield buildings and directly on top of portions of the reactor auxiliary buildings The shield and reactor auxiliary buildings are within the scope of license renewal and have safety-related intended functions Structural failure of the vent stack could result in these buildings being unable to perform their safety-related intended function

(2) The vent stacks contain and support radiation monitors that are relied upon to function in the event of a waste gas accident The high-radiation alarms from these monitors are a signal to manually close the control room ventilation intake dampers (For example, see Amendment 18 in Section 15 4 2-2, of the Unit 1 UFSAR, dated April 2001.)

(3) Blockage of effluent flow from the vent stack as a result of a structural failure could prevent the shield building ventilation system (SBVS) from performing its in-scope intended function.

Non-safety-related structures and components of which a failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54 4(a)(1) should be included within the scope of the License Renewal Rule The failure of the vent stack could potentially damage safety-related SSCs that have a spatial relationship with the vent stack, or could prevent the satisfactory function of the safety-related radiation monitors and the SBVS Justify why the plant's vent stack structures are not within the scope of license renewal and subject to an aging management review.

2.4 2 - 1 2 4.2 6 - 1

In Section 2 4.2 6 of the LRA, the applicant discusses the need for fire barriers to retard the spread of fire and states that fire-resistant panels (e g , Thermo-lag, sheet metal/ceramic fiber) mounted on steel framing are used as fire barriers Section 2 4.2 6 further references Table 3.5-8 of the LRA and Appendix 9 5A of the Unit 1 and 2 UFSARs, which state that barriers (e g , wall, floors, ceiling) divide the plant into fire areas In Table 3 5-8 of the LRA, the licensee notes that concrete and steel structural components that serve as fire barriers are addressed with each structure

Although reference is made to structural steel for each structure discussed in the civil/structural sections of the LRA, no reference is made to the fire-resistive coverings on any structural steel in those structures For each structure within the scope of license renewal, verify whether any structural steel fire barrier has been provided with fire-resistive coverings. If any barriers are identified, justify why structural steel fire barriers provided with fire-resistive coverings are considered outside the scope of license renewal or are not subject to an AMR

2 4 2 - 2 2.4 2.6 - 2

In Section 2 4 2 6 of the LRA, the applicant discusses fire barriers that provide compartmentalization and containment. Page 9 5A-136A of the Unit 2 UFSAR indicates that guard pipes are used in the hydrogen system, however, the NRC staff is unable to identify this feature in any of the tables in the LRA Justify why the guard pipe in the hydrogen system is considered to be outside the scope of license renewal or are not subject to an AMR

2 4 2 - 3 2.4 2 7 - 1

In Section 9 1 of the Unit 1 and 2 UFSARs, the applicant states that the fuel storage racks are designed to maintain subcritical conditions in the fuel pool However, Section 2 4 2.7 of the LRA does not list maintaining subcritical conditions as one of the attributes of the fuel handling building In addition, none of the components or commodity groups listed in Table 3 5-9 of the LRA is credited with the intended function of maintaining subcritical conditions Justify why maintaining subcritical conditions is not identified as an intended function

2.4 2 - 4 2 4 2.7 - 2

The fuel handling building vent stacks are shown on General Arrangement Drawing 8770-G-074 at location G8 The vent stack for Unit 1 is also shown in General Arrangement Drawing 8770-G-073 at location B8. It appears that approximately 35 feet of this component or structure, which has an outer diameter of approximately 4 5 feet, runs parallel to and is supported by the new fuel storage transfer area south wall On the basis of the limited information provided in the drawings, it appears that the vent stack sits on top of a 12-foot tall structure On the basis of the description on page 9 4-8 of the Unit 2 UFSAR, this structure appears to be the exhaust plenum housing for a prefilter, a HEPA filter, and an exhaust fan. The vent stack and its base structure sit on top of the fuel handling building's HVAC room The edge of the stack is approximately 4 feet from the east wall of the noble gas monitor enclosures

The vent stack is a substantial structure in close proximity to the noble gas monitor enclosures and new fuel storage area walls, and directly on top of the HVAC room The fuel handling buildings and noble gas monitor enclosures are within the scope of license renewal and have safety-related intended functions. Structural failure of the vent stack could cause these buildings to be unable to perform their safety-related intended functions

On page 9 4-10 of the Unit 2 UFSAR, the applicant states that ". the Fuel Handling Building . air exhaust is vented through a stack, which minimizes the probability of the entrance of external missiles " 10 CFR 54.4(a)(2) states, in part, that all non-safety related systems, structures, and components of which failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54 4(a)(1) should be included within the scope of license renewal

It appears that the failure of the vent stack could potentially damage safety-related structures and components, which have a spatial relationship with the vent stack, and could allow external missiles to enter the fuel handling building Justify why the fuel handing building stack structures are considered to be outside the scope of license renewal or are not subject to an AMR

2.4 2 - 5 2 4 2 8 - 1

In Section 9 6 2 of the Unit 1 UFSAR, the applicant lists a fuel pool bulkhead monorail as an overhead load handling system Clarify if this monorail is included in LRA Table 3 5-9 on page 3 5-67 as a component of the " trolley hoists and cranes" component group If the fuel pool bulkhead monorail is not considered to be within the scope of license renewal and subject to an AMR, justify its exclusion.

2.4 2 - 6 2 4 2 8 - 2

In Section 2 4.2 8 of the LRA, the applicant references Table 3.5-9, which indicates that only the fuel handling tools for Unit 2 are within the scope of license renewal and subject to an AMR In Section 9 1 of the Unit 1 and 2 UFSARs, the applicant states that one of the design criteria for the new fuel and spent fuel pools is to maintain subcritical conditions However, in Section 9 1.2 2 of the Unit 1 UFSAR, the applicant indicates that criticality is prevented, in part, by correct functioning of the fuel handling tools, including the poisoned "L" inserts and cell blocking devices Justify why these fuel handling tools are considered to be outside the scope of license renewal

2 5 - 1 2.5 - 1

Assuming the unavailability of offsite systems (e g , offsite system protective relaying), describe how onsite safety systems are protected from voltage and frequency fluctuations that may result from offsite equipment failures or from natural phenomena such as lightning Describe how the Class 1E system is designed to ensure that any offsite system malfunction or natural phenomena, such as lightning, will not prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54 4(a)(2).

3.1 - 1 3 1.4 - 1

In LRA Section 3 1.4, "Reactor Vessel Internals Inspection Program," the applicant indicates that this program is plant-specific and is intended to supplement the reactor vessel internals inspections required by the inservice inspection programs conducted under Section XI of the Boiler and Pressure Vessel Code promulgated by the American Society of Mechanical Engineers (ASME) The applicant further indicates that it will submit an integrated report for St Lucie Units 1 and 2 to the NRC prior to the end of the initial operating license term for St Lucie Unit 1, and this report describe the St. Lucie inspection plan. The staff expects the inspection plan to include the St Lucie Unit 1 long-term inspections and inservice monitoring as described in Subsections 5 1 and 5 2 of the "St. Lucie Unit 1 – Thermal Shield Recovery Program Final Core Support Barrel Inspection Report (Post-Cycle 6)," L-86-181, dated April 25, 1986 Confirm this expectation, or provide justification for its exclusion

3.1 - 2 3 1 6 - 1

In LRA Table 3 1-1 on page 3 1-66, the applicant discussed aging management of U-tubes, but not tubes In Sections 3 1 6.2 1 and 3 1 6 2.2 of the LRA, the applicant discusses aging issues related to tubes. Clarify whether the U-tubes identified in Table 3 1-1 represent the low-row (short radius) U-bend tubes or the entire tube bundle

3.1 - 3 3 1.6 - 2

In Table 3 1-1, "Reactor Coolant Systems," of the LRA, the staff identified that certain aging effects, which apply to steam generator components, are absent. Explain or justify why the following aging effects are not specified in Table 3 1-1·

• On page 3 1-69 of the LRA, the applicant specified that the external surface of the primary instrument nozzles may be affected by leaking borated water However, there was no aging effect and associated aging management program applied to the primary instrument nozzles under this external environment

• Clarify why loss of material due to boric acid corrosion (on the external surface) was not an aging effect applied to the secondary manway and handhold closure covers, shell assembly, feedwater nozzles and safe ends, steam outlet nozzles and safe ends, and primary heads

• Table 3 1-1 of the LRA identified cracking as an aging effect for Unit 1 stainless steel tube support lattice bars, but did not identify cracking Unit 2 carbon steel tube support lattice bars Carbon steel is susceptible to cracking in the treated water environment Clarify why cracking is not applicable to the Unit 2 tube support lattice bars

• Clarify why the wall thinning attributable to erosion was not applicable as an aging effect for secondary manways and handholds

3 1 - 4 3 1.6 - 3

In NRC Information Notice 90-04, "Cracking of the Upper Shell-to-Transition Cone Welds in Steam Generators," the staff states that if general corrosion or pitting of the steam generator shell is known to exist, the inspection program in Section XI of the ASME Code may not be sufficient to differentiate isolated cracks from inherent geometric conditions of the shell. Describe additional inspection procedures for the upper and lower steam generator shells, if general corrosion or pitting exists in the St. Lucie steam generator shells

3 1 - 5 3 1.6 - 7

Discuss tube plugs installed in the Unit 1 and 2 steam generators, such as plug type and operating experience Confirm that all tube plugs use thermally treated Alloy 690 material

3 2 - 1 3 2 - 1

In Table 3 2-2, pages 3.2-14 (Note 1), 3 2-16 (Note 2), and 3 2-17 (Note 1) of the LRA, the applicant states that stainless steel and glass in an environment of hydrazine or sodium hydroxide (NaOH) was determined to have no aging effects requiring management. The applicant is requested to summarize the technical information it identified, and provide the basis and the justification that lead to the determination

3 3 - 1 15 draft RAIs

For carbon steel, stainless steel, bronze, brass, and copper bolting in the following systems and for the environments to which they are exposed, justify why the LRA excludes the aging effects that involve loss of material and cracking Include the bounding humidity level for the outdoor, indoor-not air conditioned, containment, and buried environments The systems that should be considered are instrument air, component cooling water, diesel generator, intake cooling water, primary water makeup, service water system, turbine cooling water (Unit 1 only), ventilation, sampling, and steam and power conversion.

Provide a summary of the plant-specific operating experience associated with the degradation of bolting

3 3 - 2 5 draft RAIs

Recent experience with extensive wastage of the vessel head as a result of boric acid leakage at the David Bessie Nuclear Power Plant suggests the seriousness of boric acid corrosion (see NRC Information Notice (IN) 2002-11, "Recent Experience With Degradation of Reactor Pressure Vessel Head," dated March 12, 2002) Clarify whether the following components are likely to be externally exposed to borated coolant leaking from any adjacent systems or components·

(1) component cooling water system carbon steel surge tanks, pump bodies, and heat exchanger shells;

(2) demineralized makeup water system (any component);

(3) instrument air system carbon and galvanized steel components, such as instrument air receivers, bolting, dryers, and compressor cooler shells;

(4) intake cooling water system carbon steel basket strainers and valve bodies; and

(5) turbine cooling water (Unit 1 only) system carbon steel components

3 3 - 3 8 Draft RAIs

In Table 3 3-5, "Emergency Cooling Canal," and Table 3 3-9, "Intake Cooling Water," please clarify the environment to which the concrete with embedded/encased carbon steel piping/fitting is exposed. In particular, state whether that environment is raw water-salt water, outdoor air, or some other(s)

The raw water-salt water environment contains chlorides Similarly, the outdoor environment of St Lucie is defined in the LRA as moist, salt-laden atmospheric air, with temperatures of 27EF – 93EF, 73% average humidity, and exposure to weather, including precipitation and wind Therefore, the outdoor environment also contains chlorides. These chlorides in the moist, salt-laden atmospheric air may reach the steel/concrete interface in the interior of the concrete through the process of permeation, infiltration, and condensation through the pores of the concrete. Accumulation of high enough levels of chlorides will result in attacks on and disruption of the protective film formed on the surfaces of the steel as a result of the originally high pH levels in the concrete environment. Once some particular region of the protective film is destroyed, localized corrosion of the steel will begin through an electrochemical process. However, Tables 3 3-5 and 3 3-9 of the LRA do not identify any aging effects for carbon steel components in the emergency cooling canal system and the intake cooling water system associated with external exposure to an embedded/encased environment.

Explain why the aging process as described is not applicable to St. Lucie, and discuss the operating history of the plant to support the conclusion regarding the absence of applicable aging effects with respect to cracking and loss of materials

3 3 - 4 8 Draft RAIs

In Table 3.3-11, "Primary Makeup Water," of the LRA, the applicant stated that no aging effect requiring aging management is applicable to stainless steel piping/fittings embedded/encased in concrete. Stainless steel components are much more resistant to chloride-related corrosion than carbon steel components However, the applicant also stated that plant experience has identified loss of materials and cracking as applicable aging effects for stainless steel components in the emergency core cooling system (ECCS) pipe tunnel

Explain why the aging effects applicable to stainless steel components in the ECCS pipe tunnel are not applicable to the stainless steel piping/fittings embedded/encased in concrete at St Lucie. Also discuss the operating history with regards to stainless steel components in the embedded/encased environment to support the conclusion regarding the absence of applicable aging effects with respect to cracking and loss of materials

3 3 - 5 8 Draft RAIs

If the concrete structure in which the carbon steel components are embedded is only exposed to atmospheric air with negligible levels of chlorides, the embedded/encased steel piping/fittings may still be susceptible to a corrosion process attributable to the carbon dioxide present in the atmospheric air. This corrosion process operates via the generation of carbonic acid, which reduces the pH level in the vicinity of the steel/concrete interface. This neutralization process, in turn, disrupts the passivity of the protective films and permits attacks on the underlying carbon steel substrate The water/cement ratio of the concrete is an important factor in affecting the rate of this corrosion process. Justify why this aging process is not applicable to St. Lucie. Discuss the operating history to support the absence of applicable aging effects with respect to cracking and loss of materials

3 3.1 - 1 3 3 1-2

In Appendix C, Section 4.1.3, "Air/Gas," of the LRA, the applicant describes the air/gas environments found at St Lucie, Units 1 and 2. Aging effects of components exposed to the air/gas environment depend, in part, on the type of air/gas environment, the operating temperature, and the water content. Provide the characteristic parameters of the air/gas environments applicable to the components found in the CVCS. Also provide the bases by which the applicant determined that there are no aging effects requiring management for those components that are exposed to the air/gas environment

3 3.11 - 1 3 3 11-1

Clarify whether hardening is an applicable aging effect for the rubber materials of the expansion joints in the primary makeup water system If so, discuss how this aging effect will be managed If not, please provide the basis

3 3.11 - 2 3.3 11-2

Identify the composition of the internal air/gas environment to which the fittings and nozzles of the hose station of Unit 2 are exposed, and specify the level of humidity of this particular environment Also clarify whether loss of material is an applicable aging effect and, if so, identify and describe the applicable aging management program. If not, please provide the basis

3 3 1-2 3.3 1-4

Explain the difference between the outdoor environments described in Appendix C, Section 4 2.1, of the LRA, and the outdoor environment in the ECCS pipe tunnel Also explain how this difference leads to differences in aging effects.

3 3 13-1 3 3 13-2

The applicant states that the Periodic Surveillance and Preventive Maintenance Program provides visual inspection of component surfaces Describe how visual inspection is conducted for the submerged surfaces of the sump pump

3 3.14 - 1 3 3 14 - 1

Identify the composition of the internal air/gas environment to which the Unit 1 instrument air compressor cooling water head tank is exposed, and specify the level of humidity of this particular environment. Also clarify whether the tank wall is subjected to a changing wetting environment as the water level changes. In addition, state whether loss of material is an applicable aging effect and, if not, please provide the basis

3 3.15 - 1 3 3 15 -1

In Table 3 3 15, "Ventilation," the applicant identifies, for the control room air-conditioning subsystem, loss of material as an applicable aging effect for the carbon steel filter housing, which is internally exposed to an air/gas environment, but not for carbon steel component valves and piping/fittings that are exposed to the same environment Please explain this discrepancy

3 3 15 - 2 3.3 15 - 6

In Table 3 3-15, "Ventilation," of the LRA, the applicant indicates that the Periodic Surveillance and Preventive Maintenance Program manages the loss of material on the inside surface of several components, such as the plenums and filter housing, which are exposed to an internal air/gas environment. In Section B.3 2.11, " Periodic Surveillance and Preventive Maintenance Program," of the LRA, the applicant states that surface conditions of systems, structures, and components are monitored through visual examinations and leakage inspections to determine the existence of external and internal corrosion or deterioration.

The presence of leakage from a component indicates that the component has lost its ability to perform its intended pressure boundary integrity function. Explain whether the components' capability to perform its intended function is maintained by managing the loss of material or by periodic replacement If it is by replacement, discuss the frequency with which replacement will be performed.

3 3 16 - 1 3 3 16 - 1

In Table 3 3-13 of the LRA, the applicant identifies loss of material as an applicable aging effect for the stainless steel yard sump pump of the service water system, which is exposed to an internal environment of raw water (drains). The applicant also identifies the Periodic Surveillance and Preventive Maintenance Program as the applicable aging management program Explain why loss of material is not identified as an applicable aging effect for the stainless steel valves and piping/fittings of the waste management system, which are exposed to the same environment of raw water (drains)

3 3 2 - 1 3 3 2-1

In Appendix C, Section 4 1.1, "Treated Water," the applicant states that crevice corrosion is insignificant for an environment with extremely low oxygen content (less than 0 1 ppm) The applicant also states that oxygen is required for pitting corrosion Oxygen can be a contributor, but is not needed for crevice and pitting corrosion of metal. The applicant is requested to provide references supporting its position

3 3 2 - 2 3 3 2-3

The applicant did not identify stress-corrosion cracking (SCC) as an aging effect for the CCW system components that are exposed to treated water. However, stainless steel components exposed to treated water can experience SCC. In addition, field experience reported in Appendix C of Topical Report (TR) 107396, " Closed Cycle Water Chemistry Guideline,"
prepared by the Electric Power Research Institute (EPRI), indicates that if component cooling water is treated with nitrite as a corrosion inhibitor, carbon steel components exposed to treated water can experience intergranular stress corrosion cracking (IGSCC) Cracking of CCW piping is also reported in NRC Licensee Event Report (LER) 91-019-00, "Loss of Containment Integrity Due to Crack in Cooling Water Piping," dated October 26, 1991. Provide the bases for excluding cracking as an applicable aging effect for CCW system carbon and stainless steel components that are exposed to treated water.

3 3 2 - 3 3 3 2-4

The applicant did not identify SCC as an aging effect for the CCW heat exchanger tubes that are exposed to raw water. The operating experience at Turkey Point Station, shows that the CCW heat exchanger tubes, which are made of aluminum brass and exposed to raw water on the tube side, are susceptible to SCC (see U S Nuclear Regulatory Commission "Safety Evaluation Report with Open Items Related to the License Renewal of Turkey Point Nuclear Plant, Units 3 and 4," dated August 2001, p. 239) Provide the bases for excluding cracking as an applicable aging effect for CCW heat exchanger tubes that are exposed to raw water at St. Lucie

3.3 2 - 4 3 3.2-5

Aging effects for CCW system components exposed to the air/gas environment depend, in part, on the type of air/gas environment, the operating temperature, and the water content. Provide the characteristic parameters of the air/gas environments applicable to the components found in the CCW system. Also provide the bases for excluding corrosion as an applicable aging effect for CCW components that are exposed to the air/gas environment.

3.3 2 - 5 3 3 2-11

On page B-45 of Appendix B to the LRA, the applicant states that for the Intake Cooling Water System Inspection Program, branch connections are examined as plant and industry experience warrants Since this is an existing program, describe the findings of past examinations and discuss which aging effect(s), if any, have been observed at the branch connections Include the corresponding root cause of any identified aging effects

3 3 4-1 3 3 4-1

In Section 9.5 6 3, "System Evaluation," on page 9 5-12b of the Unit 2 updated Final Safety Analysis Report (UFSAR), the applicant states that the air receiver for the air-start system of the emergency diesel generator collects moisture to preclude fouling of the air-start valve with moisture and contamination. Provide justification for not identifying loss of material as an aging effect for the carbon steel, aluminum alloy, and copper alloy air-start system components that are exposed to the internal moist air environment

3.3 4-2 3 3 4-2

Provide justification for not identifying loss of material as an aging effect for air-start system components fabricated from aluminum alloy or copper alloy exposed externally to an indoor-not air conditioned environment

3 3 4-3 3 3 4-3

In Table 3.3-4 on page 3 3-33 of the LRA, the applicant identifies loss of material as a potential aging effect for the carbon steel fuel oil tanks exposed to an air/gas environment, as a result of the potential for moisture contamination Please provide justification for not identifying loss of material for the carbon steel day tanks, which are also exposed to the same air/gas environment

3 3 4-4 3 3 4-4

In Table 3 3-4 on page 3 3-26 of the LRA, the applicant states that plant experience shows a history of loss of material as a result of corrosion of the copper and aluminum cooling water radiator fins in the cooling water system exposed to an indoor-not air conditioned environment The applicant is requested to explain why other copper and aluminum alloy components exposed to indoor or outdoor environments in the diesel generators and support systems are not subject to aging management. These components include tubing/fittings, air start motors, air start motor lubricators, frame arrestors (in outdoor environment), and filter housings.

3 3 6-1 3 3 6-1

In Section B.3 2 8, "Fire Protection Program," on page B-39 of the LRA, the applicant states that the Fire Protection Program is credited for managing the aging effects of loss of material attributable to corrosion (including selective leaching) Please identify those components and locations that are susceptible to leaching, and the associated aging management programs

3 3.6-2 Became 3 3 6-2

The fire water supply system consists of a 12-inch cement-lined, cast-iron, underground pipe that loops around the plant The cement lining may degrade due to cracking or spalling and cause flow blockage in the piping Explain why an aging management review was not performed for the cement lining

3 3.6-3 3 3-44

The fire water supply system consists of a 12-inch cement-lined, cast-iron, underground pipe that loops around the plant Explain how the aging effect of loss of material as a result of corrosion is managed for the external surfaces of the buried pipe

3 3.6-4 3 3 6-3

In Section B 3 2 8 of Appendix B to the LRA, the applicant states that functional testing and flushing of the system clear away internal scale and corrosion products that could lead to blockage or obstruction of the system. If this statement refers to biofouling as an applicable aging effect, discuss why Table 3 3.6 of the LRA does not include biofouling as an applicable aging effect

3.3 8-1 3 3 8-4

In Table 3 3-8, "Instrument Air," of the LRA, the applicant identifies loss of material as an applicable aging effect for carbon steel, stainless steel, and copper alloy components that are located upstream of the air dryers and, therefore, internally exposed to a wet air/gas environment Other components made of similar materials but located downstream of the dryers are exposed to a dry air/gas environment and, therefore, have no applicable aging effect This identification of the aging effect is reasonable for an instrument air system that has an ideal dryer, but this identification may not be supported by the operating experience at St Lucie As an example, NRC Information Notice (IN) 1987-28, "Air System Problems at U S Light Water Reactors," states that· "A loss of decay heat removal and significant primary system heatup at Palisades in 1978 and 1981 were caused by water in the air system "This experience implies that the air/gas system downstream of the dryer may not be dry Provide the technical basis for not identifying loss of material as an applicable aging effect for the components downstream of the air dryer. If loss of material is identified as an applicable aging effect for these components, provide an appropriate aging management program for that effect.

3 3 9-1 3.3 9 - 4

Explain why loss of material is not an aging effect for stainless piping/fittings and tubing/fittings in the intake cooling water system that are exposed to an indoor-not air conditioned environment

3.3 9-2 3 3 9-5

Several bronze, aluminum bronze, and aluminum brass components in the intake cooling water system are externally exposed to outdoor or indoor-not air conditioned environments These components include pump and valve bodies and piping/fittings. The applicant states that there is no applicable aging effect for these components. In Section 5 1 of Appendix C to the LRA, however, the applicant states, "Additionally, bronze and brass are considered susceptible to pitting when zinc content is greater than 15%, and aluminum bronze is considered susceptible to pitting when the aluminum content is greater than 8% "Since the zinc content in brass can be greater than 15% and the aluminum content in aluminum bronze may vary from 4 to 15%, explain why loss of material is not an applicable aging effect for the bronze, aluminum bronze, and aluminum brass components in the intake cooling water system.

3 3 9-3 3 3 9-6

The applicant relies on detection of leakage for managing loss of material on the inside surface of several components that are exposed to raw water. The presence of leakage from a component, however, would indicate that the component could not perform its intended function as a pressure boundary The applicant is requested to justify why the use of this program alone is adequate for managing loss of material from the inside surface of the components that are exposed to raw water

3 4 - 1 3 4 1

For stainless steel components in LRA Table 3 4-1, such as valves, tubing/fittings, filters, and flex hoses that are exposed to an internal air/gas environment, the LRA does not identify any effects requiring aging management Explain why the LRA does not consider moisture and liquid pooling effects, which can contribute to the aging effects of loss of material as a result of pitting corrosion and cracking

3 4 - 2 3 4.2

In tables 3 4-1 and 3 4-2 of the LRA, the applicant indicates that carbon steel bolts are not subject to any aging effects that require aging management. Explain why the effect of humidity in the external environment is not considered to cause aging that leads to a loss of preload.

3.4 - 3 3.4 4

Provide justification for excluding flow-accelerated corrosion (FAC) as an aging mechanism that can cause wall thinning in auxiliary feedwater piping components The scope of the FAC program includes main feedwater, blowdown, and main steam and turbine, but not auxiliary feedwater piping and components

3 4 - 4 3 4 6

In Tables 3 4-1 and 3 4-2 of the LRA, the applicant identified the Boric Acid Wastage Surveillance Program to manage the aging effects in piping, valves and fittings to ensure that boric acid corrosion does not lead to degradation of the pressure boundary. The Boric Acid Wastage Surveillance Program manages aging effects associated with aggressive chemical attack. Provide a discussion of how this program manages aging effects associated with elevated temperatures and stress levels to prevent loss of preload in mechanical bolting

3 5 - 1 3 5 - 1

Considering the vulnerability of concrete structural components, the staff has required previous license renewal applicants to implement an aging management program to manage the aging of these components. The staff's position is that cracking, loss of material, and change in material properties are plausible and applicable aging effects for concrete components inside containment, as well as for other structures outside containment. For inaccessible concrete components, the staff does not require aging management if the applicant is able to show that the soil/water environment is nonaggressive, however, the staff requires inspection through an aging management program for all other concrete components Provide justification for concluding that there are no applicable aging effects for (1) reinforced concrete walls, slabs, trenches, foundations, shields, and roofs above groundwater in outdoor and containment air environments and (2) reinforced concrete interior shield walls, beams, slabs, missile shields, and equipment pads inside containment

3 5 - 10 3.5 - 12

Provide a more detailed description of FPL provisions for inspecting inaccessible structural components Specifically, for some inaccessible structural components, there may not be a matching accessible component with the same material and environment to provide an indication of the condition of the inaccessible component. In NUREG 1611, "Aging Management of Nuclear Power Plant Containments for License Renewal," issued September 1997, the staff specifies that applicants for license renewal need to evaluate on a case-by-case basis, the acceptability of inaccessible areas, even though conditions in accessible areas may not indicate the presence of degradation to components in inaccessible areas

3 5 - 11 3 5 - 13

In Section 3 5 2 4 2 of the LRA, the applicant identified cracking as an aging effect requiring management for miscellaneous structural components; however, in the paragraphs preceding this conclusion, the LRA states that cracking is not considered to be an applicable aging effect In addition, LRA Tables 3 5-2 through 3 5-16 do not list cracking as an applicable aging effect for any miscellaneous structural components Please resolve this discrepancy.

3 5 - 12 3 5 - 14

In Section 3 5 1 3 of the LRA, the applicant concluded that masonry walls do not need aging management during the period of extended operation However, cracking and degradation of masonry walls is a generic observation at nuclear power plants NRC Information Notice 86-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11," and the findings of walkdowns at the nuclear power plants included in the resolution of Unreviewed Safety Issue A-46, indicate that in-scope masonry walls need periodic inspections Please provide information regarding the basis for not developing a masonry wall aging management program

3 5 - 2 3 5 - 2

Loss of material is considered to be an applicable aging effect for galvanized carbon steel components in a " wetted" outdoor environment; however, the LRA does not list any aging effects for galvanized carbon steel components in an outdoor environment. Zinc-based coating of carbon steel may not provided complete protection from corrosion for components located in a humid environment Provide justification for concluding that there are no aging effects for galvanized carbon steel components in an outdoor environment. In addition, distinguish between a "wetted" outdoor environment and an outdoor environment

3 5 - 3 3 5 - 3

LRA Tables 3 5-2 through 3 5-16 do not identify any aging effects for the following components

- silicone fuel transfer tube penetration flexible membranes (in annulus) (Table 3 5-2)
- lubrite sliding supports (Table 3 5-2)
- silicone mechanical penetrations (Table 3 5-8)
- carbon steel plate fire-sealed isolation joint (Table 3.5-8)

Specifically, the staff does not agree with the applicant's characterization of the radiation- resistant silicon rubber membrane material used in the fuel transfer tubes, since movements attributable to temperature fluctuations in the containment and fuel handling building could result in misalignment and loss of seal Provide justification as to why these membrane seals (or the transfer tubes in the annular space) should not have a nominal aging management program to ensure the effectiveness of the seals during the period of extended operation

For the lubrite plates, provide their location(s), including the operating environment (temperature, humidity, and neutron flux) and loads (static and vibratory) to which they are subjected. Include occasional exposure to any degrading environments, such as borated water spills or leakage. Also, provide information related to the manufacturer-suggested life of the product under the expected operating conditions

For the silicone mechanical penetrations in the fire-rated assemblies, provide justification for concluding that increased hardness and shrinkage are not applicable aging effects

For the carbon steel fire-sealed isolation joint, provide justification for concluding that loss of material is not an applicable aging effect

3 5 - 4 3 5 - 4

Loss of material is considered to be an applicable aging effect for carbon steel components in indoor - not air conditioned and outdoor environments However, loss of material is not considered to be applicable for carbon steel components located in indoor - air conditioned environments Provide justification for making this distinction for carbon steel components in these different environments.

3 5 - 5 3 5 - 5

The LRA does not list any applicable aging effects for earthen canal dikes in the intake, discharge, and emergency cooling canals (Table 3 5-10). Earthen water-control structures are susceptible to loss of material and loss of form resulting from erosion, settlement, sedimentation, waves, currents, surface runoff, and seepage. Provide justification for concluding that loss of material and loss of form are not applicable aging effects for the earthen canal dikes.

3 5 - 6 3 5 - 6

The LRA does not list any applicable aging effects for stainless steel fuel transfer tubes and expansion bellows located in a containment air environment Considering prior industry experience with cracking of expansion bellows, justify why cracking is not considered to be an applicable aging effect for stainless steel fuel transfer tubes and expansion bellows Are these bellows subjected to a periodic containment leak rate testing program?

3 5 - 7 3 5 - 7

Given the potential for clogging of the recirculation sump screens, provide past operating experience with clogging from peeling paint or other debris In addition, discuss any aging management programs that will be used to ensure the effectiveness of protective coatings throughout the period of extended operation.

3.5 - 8 3 5 - 9

Referring to Section 3 5 2.2 2 of the LRA, discuss St Lucie's operating experience regarding the effectiveness of its application of the impressed current cathodic protection system to prevent the corrosion of carbon steel in fluid structural components that are exposed to raw water. Is the impressed current cathodic protection system used for items other than the sheet piling? If yes, briefly discuss the operating experience with respect to the effectiveness of these applications.

3 5 - 9 3 5 - 10

To demonstrate the potential for aging of concrete components below groundwater, provide the following information:

(1) average levels of contaminants (chloride and sulfates) and the pH level in the ground water soil surrounding below-grade concrete members

(2) grade elevations and the ground-water level fluctuations in the areas surrounding below-grade concrete members

(3) existing condition of concrete structural members exposed to groundwater

3 6 - 1 3 6 1 1 - 1

Sections 3 6 1.1.4 of the LRA evaluates the applicable aging effects for electrical components that can be expected to occur as a result of radiation The applicant states that the DOE Cable Aging Management Guide, Section 4.1.4, provides a threshold value and a moderate dose for various insulating materials The threshold value is the amount of radiation that causes incipient to mild insulation damage. Once this threshold is exceeded, damage to the insulation increases from mild to moderate or severe as the total dose increases

The moderate damage value indicates the value at which the insulating material has been damaged but is still functional St Lucie Units 1 and 2 evaluations use the moderate damage dose from the DOE Cable Aging Management Guide as the limiting radiation value shown in Table 3 6-3 of the LRA The maximum dose shown in Table 3 6-3 includes the maximum 60-year normal exposure inside containment. The applicant concludes that because the maximum operating radiation dose to cable insulation will not exceed the moderate damage doses no aging management are required for radiation Section 3 1.1.5 of the LRA evaluates the aging effects applicable for electrical components due to heat and oxygen The applicant states that it developed a maximum operating temperature for each insulation type based on cable applications at St Lucie Units 1 and 2 The maximum operating temperature indicated in LRA Table 3 6-4 incorporates a conservative value for self-heating for power applications combined with the maximum design ambient temperature. The applicant used the Arrhenius method, as described in EPRI NP-1558, to determine the maximum continuous temperature to which insulation can be exposed so that the material has an indicated "endpoint of 60 years." The applicant concludes that a comparison of the maximum operating temperature to the maximum 60-year continuous use temperature for the various insulation materials indicates that all of the insulation material used in low-and medium-voltage power cables and connections can withstand the maximum operating temperature for at least 60 years

In most areas within a nuclear power plant, the actual ambient environments (e g temperature, radiation, or moisture) are less severe than the nominal plant environment However, in a limited number of localized areas, the actual environments may be more severe than the nominal plant environment. Conductor insulation materials used in cable and connections may degrade more rapidly than expected in these adverse localized environments and require aging management. The purpose of the aging management program is to provide reasonable assurance that the intended functions of electrical cables and connections exposed to adverse localized environments caused by radiation, heat, or moisture will be maintained to be consistent with the current licensing basis through the period of extended operation

Therefore, for non-environmentally qualified (non-EQ) cables, connections (connectors, splices, and terminal blocks) are within the scope of license renewal and are located in the containment or the reactor auxiliary building, describe the aging management program for accessible and inaccessible electrical cables and connections exposed to an adverse localized environmental caused by heat, radiation, or moisture.

3 6 - 2 3 6.1.1 - 2

Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR) Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in the instrument loop. Visual inspection may not be sufficient to detect aging degradation from heat, radiation, or moisture in the instrumentation circuits with sensitive, low-level signals Because low-level signal instrumentation circuits may operate with signals that are normally in the pico-amp or less, they can be affected by extremely low levels of leakage current. These low levels of leakage current may affect instrument loop accuracy before the adverse localized changes are visually detectable. Routine calibration tests performed as part of the plant's surveillance test program can be used to identify the potential existence of this aging degradation Provide a description of your aging management program that will be relied upon to detect this aging degradation in sensitive, low-level signal circuits

4 1 - 1 4 1 - 1

Table 4.1-1 of the LRA does not identify pipe break postulation based on cumulative usage factor (CUF) as a TLAA Section 3 6 2 2.1 of the St Lucie Unit 2 UFSAR describes the criteria used to provide protection against pipe whip inside the containment Part of the criteria specifies the postulation of pipe breaks at locations where the CUF exceeds 0 1. Although the fatigue usage factor calculation was identified as a TLAA, the pipe break criterion was not identified as a TLAA. However, the usage factor calculation used to identify postulated pipe break locations meets the definition of a TLAA as specified in 10 CFR 54.3 and, therefore, the staff considers the associated criteria for pipe break postulation a TLAA Provide a description of the TLAA performed to address the pipe break criteria for St Lucie Unit 2. Also identify any pipe break postulations based on CUF at St Lucie Unit 1 and describe the TLAA performed for these locations Indicate how these TLAAs meet the requirements of 10 CFR 54 21(c)

Table 4 1-1 of the LRA does not identify fatigue of the reactor coolant pump flywheel as a TLAA Indicate whether fatigue crack growth calculations were performed for the St Lucie Unit 1 and 2 reactor coolant pump flywheels If fatigue crack growth calculations were performed for these pump flywheels, describe the TLAA evaluations and indicate how these TLAAs meet the requirements of 10 CFR 54 21(c)

4 3 - 1 4.3 1 - 1

In Section 4 3 1 of the LRA, the applicant discusses its evaluation of the fatigue TLAA for ASME Class 1 components The discussion indicates that based on its review of the plant's operating history, the applicant concluded that the number of cycles assumed in the design of the ASME Class 1 components is conservative and bounding for the period of extended operation Section 3 9 of the UFSARs for St Lucie, Units 1 and 2, provides a listing of transient design conditions and associated design cycles Provide the following information for each transient described in the UFSARs:

(1) the current number of operating cycles and a description of the method used to determine the number and severity of the design transients from the plant's operating history

(2) the number of operating cycles estimated for 60 years of plant operation and a description of the method used to estimate the number of cycles at 60 years

(3) a comparison of the design transients listed in UFSAR with the transients monitored by the Fatigue Monitoring Program (FMP) as described in Section B3 2.7 of the LRA; an identification of any transients listed in the UFSAR that are not monitored by the FMP, and an explanation of why it is not necessary to monitor these transients

4 3 - 2 4.3 - 2

In Section 4 3.1 of the LRA, the applicant indicates that the pressurizer surge lines were reanalyzed in response to NRC Bulletin 88-11, "Pressurizer Surge Line Stratification " Identify whether calculations that meet the definition of a TLAA were performed in response to NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems " Describe the actions that will be taken to address NRC Bulletin 88-08 throughout the period of extended operation

4.3 - 3 4 3.3 - 1

In Section 4 3 3 of the LRA, the applicant discusses its evaluation of the impact of the reactor water environment on the fatigue life of components The discussion references the fatigue-sensitive component locations for an older vintage Combustion Engineering plant identified in NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components." The LRA indicates that these fatigue-sensitive component locations were evaluated for St Lucie, Units 1 and 2. The LRA also indicates that the later environmental fatigue correlations contained in NUREG/CR-6583, "Effects of LWR Coolant Environments on Fatigue Design Curves of Carbon and Low-Alloy Steels," and NUREG/CR-5704, " Effects of LWR Coolant Environments on Fatigue Design Curves of Austenitic Stainless Steels," were considered in the evaluation Provide the results of the usage factor evaluation for each of the six component locations listed in NUREG/CR-6260

4 4 - 1 4 4 - 3

In Section 4 4 of the LRA, the applicant indicates that environmental qualification (EQ) acceptance criteria for temperature is the component's maximum required operating temperature. If the maximum operating temperature of a component for normal plant conditions is equal to or less then the temperature to which the component was qualified by test, the component is considered qualified With a component's normal operating temperature equal to the temperature to which it was tested to demonstrate EQ, explain how temperature margin (or other conditions or attributes of the Arrhenius method) has been utilized to account for uncertainties of the Arrhenius method

Explain how margin has been maintained to account for uncertainties of the Arrhenius method Describe the margins built into the qualification process that will remain in the qualification process after re-analysis for 60 years Explain why these remaining margins can be considered sufficient to address the uncertainties of the Arrhenius method for establishing qualified life

4 4 - 2 4 4 - 2

Explain and clarify how the electro-mechanical components of a normally energized continuous duty motor are maintained qualified for 40 years and 60 years of continuous operation

4.5 - 1 4 5 1 - 1

In Section 4 5.1of the LRA, the applicants states that the containment vessels are designed in accordance with Section III of the ASME Boiler and Pressure Vessel Code. The LRA indicates that the design criteria provide assurance that the specified leak rate will not be exceeded under the design-basis accident conditions Discuss how the design criteria applied to the steel vessels provide this assurance.

4 5 - 2 4.5 2 - 1

In Section 4 5 2 of the LRA, the applicant states that containment penetration bellows are specified to withstand a lifetime total of 7,000 cycles of expansion and compression attributed to maximum operating thermal expansion, and 200 cycles of other effects

(1) Show that the specified cycles bound the period of extended operation

(2) For Type I and Type III containment penetrations, describe the methods used to provide assurance that the penetration bellows will withstand these specified cycles under the corresponding thermal expansion and other loads for the extended period of operation.

4 5 - 3 4 6 3 - 2

State whether the containment penetration bellows are included within the scope of the St Lucie Fatigue Monitoring Program, referred to in Sections 4 3 1 and B 3 2 7 of the LRA. If not, provide justification for not including these components in the program

461-1 46.1-1

As a result of the V C Summer event, in which primary water stress corrosion cracking (PWSCC) was identified in an Inconel 82/182 main coolant loop-to-reactor pressure vessel weld, the NRC staff is concerned about the impact of PWSCC on licensees' leak-before-break (LBB) evaluations. NUREG-1061, Volume 3, which addresses the general methodology accepted by the NRC staff for demonstrating LBB behavior, stipulates that no active degradation mechanism (more specifically, none which would undermine the assumptions made elsewhere in the LBB analysis) may be present in a line that is under consideration for LBB approval Draft Standard Review Plan Section 3 6 3, suggests that lines with potentially active degradation mechanisms may be considered for LBB approval provided that two mitigating actions or programs are in place to address the potential active degradation mechanism. Given this background

• Identify the welds in the reactor coolant pressure boundary piping approved for LBB, which contain Inconel 82/182 material that is exposed to the reactor coolant system environment

• Evaluate the impact of the V.C Summer PWSCC issue on the St Lucie LBB assessment for lines that contain welds manufactured from Inconel 82/182 material

• Identify what actions will be taken during the period of extended operation to ensure that the potential for PWSCC in Inconel 82/182 lines does not undermine the assumptions of the St. Lucie LBB analyses.

463-1 463-3

Provide a detailed description of the fatigue analysis of the core support barrel middle cylinder with the expandable plugs, including the design thermal transients and cycles Confirm that the fatigue evaluation meets the ASME Section III Class 1 fatigue criteria for the life of the plant.

463-2 463-4

Provide the source and basis for the data and information that was used to assess irradiation induced relaxation of the plug preload, which is expected to occur in the core support barrel expandable plugs at the end of 60 years of reactor operation

463-3 463-2

Provide a detailed description of the core support barrel plug preload analysis based on irradiation induced stress relaxation, showing that the expandable plugs will continue to perform their function given the predicted fluence, operating temperature, operating hydraulic loads, and thermal deflections for the period of extended operation.

464-1 464-2

Consistent with the staff's safety evaluation dated February 8, 2002, on Combustion Engineering Owners Group (CEOG) Topical Report No CE NPSD-1198-P, Revision 00, perform a plant-specific general corrosion rate analysis calculation for the bounding half-nozzle repair implemented at St Lucie Units 1 and 2. Provide a discussion or evidence which demonstrates that the general corrosion rate analysis calculation provided in CEOG Topical Report No. CE NPSE-1198-P, Revision 00, is bounding relative to the plant-specific analysis.

464-2 464-3

Consistent with the staff's safety evaluation dated February 8, 2002, on CEOG Topical Report No CE NPSD-1198-P, Revision 00, justify the conclusion in the topical report that existing flaws in ASME Class 1 nozzle Alloy 182 weldments will not grow into the adjacent ferritic pipes or vessels during the extended periods of operation Review the reactor coolant system chemistry history over the last two operating cycles for the St. Lucie Units 1 and 2 Confirm that a sufficient hydrogen over-pressure for the reactor coolant system has been implemented at the facilities and that the ingress of dissolved elemental oxygen, halide, and sulfate into the reactor coolant over this period was adequately managed and controlled (i e , minimized to acceptable levels).

B.3 1.2 - 1 B 3 1.2 - 1,2, and 3

In Section 3.1.2, "Galvanic Corrosion Susceptibility Inspection Program," of Appendix B to the LRA, the applicant states that inspections will be conducted on a sampling basis Locations selected for inspection will represent those with the greatest susceptibility to galvanic corrosion. However, there are insufficient details in the LRA concerning the program for the NRC staff to determine with reasonable assurance that the program is acceptable Provide additional information concerning the existing program or the planned development of the program elements in the following areas·

• Explain how the greatest susceptibility locations will be determined including whether these locations will be selected for each system or for all the systems

• Explain what documents or information will be used to define the inspection interval, sample size, inspection criteria, and corrective actions

• Explain how information concerning the inspections of the susceptible locations, the results of the inspections, and corrective actions will be managed, tracked, and evaluated

B.3 1.3 - 1 B 3 1.3 - 1

Provide the specific section in the American National Standards Institute (ANSI) B31.7, that will be the basis for calculating the required minimum wall thickness for Unit 1 auxiliary feedwater piping

B 3 1.3 - 2 B 3 1.3 - 2

Provide the specific section in ASME Code, Section III, that will be the basis for calculating the required minimum wall thickness for the Unit 2 auxiliary feedwater and component cooling water piping

B 3.1.3 - 3 B 3 1.3 - 3

In Section B 3 1.3 of the LRA, the applicant states that the pipe wall thinning inspection program is credited as the aging management program for managing the internal loss of material attributed to erosion Later, in describing the monitoring and trending aspect of the program, the applicant states, "The initial inspection frequency shall be established based on the first inspection results and considering measured wall thickness, corrosion rates, and minimum required wall thickness " Explain the apparent inconsistency between erosion rates and corrosion rates In addition, explain how those rates are determined

B 3 1 5 - 1 None

In Appendix B, Section 3 1.5, of the LRA, the applicant states that volumetric inspections of small bore Class 1 piping will be conducted on a sampling basis The one-time inspection program states that locations selected for volumetric inspection will be based on a risk-informed approach that ranks the susceptibility of the small bore Class 1 piping according to two essential elements· (1) a degradation mechanism evaluation to assess the failure potential of the piping system under consideration, and (2) a consequence evaluation to assess the impact on plant safety in the event of a piping failure Provide the following additional information as the information relates to your program attributes for aging management program B.3 1.5, "Small Bore Class 1 Piping Inspection."

ÿ Discuss what methodology will be used to determine the greatest potential failure susceptibility locations and discuss how the worst-case consequence locations for the small bore piping will be determined Discuss how these two essential risk-informed elements will be used to quantify the susceptibility rankings of the small bore Class 1 piping within the scope of the Small Bore Class 1 Piping Inspection

ÿ Explain which documents or information will be used to define the sample size for the volumetric inspections that will be proposed for the small bore Class 1 piping

B 3 2.1 - 1 B 3 2.1.2 - 1

On March 18, 2002, the staff issued NRC Bulletin 2002-01, which requested information relevant to the type of degradation that was detected in the Davis-Besse reactor vessel head in March 2002. The applicant responded to NRC Bulletin 2002-01 in a letter dated April 2, 2002. The Scoping program attribute in the LRA does not reference NRC Bulletin 2002-01 as part of the current licensing basis for the reactor vessel head penetration nozzles The Detection of Aging Effects program attribute in the LRA implies that only one visual examination of the bare surfaces of each unit's upper reactor vessel head will be performed If the results of the bare-surface visual examinations indicate the presence of flaw indications, additional bare-surface visual or volumetric examinations of the reactor vessel heads would be performed. As a result of the staff's review of the Operating Experience and Demonstration program attribute, the staff is under the impression that FPL completed the December 2001 visual examinations of the bare surfaces of the Unit 2 reactor vessel head With respect to the Alloy 600 Inspection Program:

• Update the Scoping program attribute to include your response to NRC Bulletin 2002-01 (dated April 2, 2002, in FPL letter L-2002-061).

• Summarize the scope and results of inservice inspections and augmented examinations that were performed on the Unit 1 and 2 reactor vessel heads Describe the impact that the inspection results will have on the program attributes for the Alloy 600 Inspection Program.

B 3 2.10 - 1 B 3 2 10 - 2

The periodic surveillance and preventive maintenance program is an existing program that will be enhanced with regard to the scope of specific inspections Provide applicable frequencies, bases, and the most recent operating history supporting the adequacy of this program for the following components in the intake cooling water system stainless steel, carbon steel and cast iron intake cooling water pumps, rubber intake cooling water pump expansion joints; and aluminum-bronze pump discharge valves exposed externally to the raw water environment The applicant provided this information for other components in the intake cooling water system

B 3 2 10 - 2 B 3.2 10 - 3

For those structures that are inaccessible for inspection through the systems and structures monitoring program, an inspection of structures with similar materials and environments may be indicative of aging effects Several components in the intake cooling water system credit this program for managing loss of material in the raw water environment Provide the applicable frequencies, bases, and the most recent operating history supporting the adequacy of this program for the following components in the intake cooling water system cast iron, carbon steel, bronze, monel, and stainless steel valves, piping, tubing, and fittings; stainless steel orifices, and stainless steel thermowells exposed internally to the raw water environment

B 3 2.10 - 3 B 3 2.10 - 4

Identify and describe the specific plant procedures and applicable documents which contain detailed guidance related to performance monitoring, testing and tube examinations of the heat exchangers Also provide the acceptance criteria and the bases for acceptance of the inspection results.

B 3.2 10 - 4 B 3.2 1 - 5

In the UFSAR for St. Lucie Unit 1, the applicant states that the component cooling water heat exchanger components exposed to raw water are protected by sacrificial anodes located in the heat exchangers. Are these sacrificial anodes credited in reducing corrosion or cracking? Identify and describe the program that provides for inspection of these anodes

B 3 2 10 - 5 B 3 2.10 - 6

In Section B.3 2.10 of the LRA, applicant states that the internal linings on piping and other components are visually inspected for degradation. What criteria are used to determine which components should be inspected? Do these inspections include inspection of lining on the inside surface of fittings such as elbows? This information is requested because the field experience described in IE Information Notice No 85-24, "Failures of Protective Coatings in Pipes and Heat Exchangers," indicates that the interior protective lining on elbows are more susceptible to degradation than that on straight piping

B 3 2.10 - 6 B 3 2.10 - 7

For the buried or submerged carbon steel piping in intake cooling water system, which is externally exposed to aggressive external environments, the Intake Cooling Water System Inspection Program does not provide sufficient information about how the applicant plans to prevent, mitigate, detect, or trend loss of material caused by corrosion at the outside surface of these piping Do you plan to use the wall thickness measurements as indicators of loss of material at the external surface of buried and submerged carbon steel piping? If so, then describe how these wall thickness will be measured

B 3 2.11 - 1 B 3 2 11 - 1

In Section B 3 2.11, "Monitoring and Trending," of the LRA, the applicant states"

The inspections, replacements, and sampling activities associated with this program are performed on a specific frequency as listed in administrative procedures, and that the results of these activities are documented The program includes various frequencies depending upon the specific component and aging effect being managed, and plant operating experience

Since this is an existing program, provide a brief description of how frequently the inspections are conducted and components are replaced For example, for Preventive Actions, the applicant states that preventive measures include charging pump block internal inspection (Unit 2 only), oil sampling and water removal, and replacement of specific structural components and component groups are based on operating experience. In Parameters Monitored or Inspected, the applicant states that certain intake cooling water system components are replaced on a given frequency based on operating experience Identify the specific frequencies of those component inspections and replacements, including how operating experience is used to determine the frequencies

B 3 2.11 - 2 B 3 2 11 - 2

The applicant provided limited information regarding the different attributes of the periodic surveillance and preventive maintenance program as far as aging management of the instrument air system components is concerned

(1) Provide information about whether the program is based on the Instrument Society of America's Standard ISA-S7.0 1-1996, "Quality Standards for Instrument Air." Specifically, discuss whether the moisture content and particulate size in the instrument air are continuously monitored. What are the acceptance criteria for particulate size and oil content in the instrument air? How often is the system sampled to ensure that air quality is maintained?

(2) Provide information about the inspection and testing frequency used for the instrument air system components Does the program follow the recommendations made by the industry report issued by the Electric Power Research Institute (EPRI) as EPRI NP-7079, "Instrument Air Systems – A Guide for Power Plant Maintenance Personnel," 1990, or its 1998 revision (i e., EPRI/NMAC TR-108147, 1998)?

B 3 2.14 - 1 B 3 2 14 - 1

In order for the staff to conclude that the monitoring and trending activities of the Systems and Structures Monitoring Program (SSMP) are adequate to detect the aging of structures and components that credit this program, provide additional information on the inspection intervals and sample sizes used for the SSMP. In particular, provide the inspection intervals and sample sizes used for the systems and structures, listed on page B-57 of the LRA, which credit the SSMP.

B 3 2 14 - 2 B.3 2 14 - 2

The SSMP is an existing program. However, in Section B 3 2.14 of the LRA, the applicant states that enhancements will be made to provide guidance for managing the aging of inaccessible concrete In particular, the staff notes that below-grade components, such as concrete slabs or building foundations, may be subject to aggressive chemical attack as a result of the chemistry (pH, sulfides, chlorides) of the groundwater. In order for the staff to determine that the SSMP will provide for adequate aging management of inaccessible concrete, provide examples of past inspection findings related to the aging of these components

B 3 2.14 - 3 B 3 2.14 - 3

In order for the staff to conclude that the SSMP will provide adequate aging management for the systems, structures and components that credit this program, provide specific examples of enhancements and improvements that have been made to the SSMP as a result of previous inspection findings

B 3 2.2 - 1 B 3.2.2.2 - 3

In Table 3 5-2 of the LRA, the applicant indicates that the containment bellows are covered by the inservice inspection program established in accordance with Section XI, Subsection IWE, of the ASME Boiler and Pressure Code. Recognizing the susceptibility of the bellows to cracking (see NRC Information Notice 92-20) as a result of transgranular stress corrosion cracking (TGSCC), provide the operating experience related to the condition of the bellows at St Lucie, Units 1 and 2. Also, provide the method used to detect degradation of the bellows

B 3 2 2 - 2 B 3 2 2 2 - 4

In the GALL aging management program XI S4, "10 CFR Part 50, Appendix J," Section 1, "Scoping of Program, " the staff specifies the options for leakage testing of containment isolation valves The options are to conduct testing (1) under the Type C test of Appendix J, or (2) along with the tests of the systems containing the containment isolation valves. Which option will the applicant implement during the extended period of operation?

B 3 2 2 - 3 B.3 2 2.2 - 3

Summarize the operating experience related to the leakage rate testing of the pressure-retaining containment components for St Lucie, Units 1 and 2

B 3 2 5 - 1 B 3 2.5 1 - 1

In Section 3.2 5 1 of Appendix B to the LRA, the applicant states that no special one-time inspections are required to verify the effectiveness of the Water Chemistry Control Subprogram for St Lucie Units 1 and 2 The applicant also states that internal surfaces of components are visually inspected for loss of material and other aging effects during routine and corrective maintenance requiring equipment disassembly. Clarify that those locations inspected during routine and corrective maintenance include representative susceptible locations (such as low flow or stagnant areas) In addition, discuss past findings that demonstrate that routine and corrective maintenance verified the effectiveness of the Water Chemistry Control Subprogram

B 3 2 5 - 2 B.3 2 5 2 - 1

In Section 3 2 5 1 of Appendix B to the LRA, the applicant states that the Water Chemistry Control Subprogram was developed in accordance with the guidance in TR-107396, "Closed Cycle Cooling Water System," published October 1997 by the Electric Power Research Institute (EPRI) and is consistent with the 10 attributes of the AMP X1 M21, "Closed-Cycle Cooling Water System,"" in the Generic Aging Lessons Learned (GALL) report, with the exception that this subprogram does not address surveillance testing and inspection. The applicant further states that the Intake Cooling Water Inspection Program implements the applicable surveillance testing and inspection aspects of the GALL program The Intake Cooling Water Inspection Program includes inspection of only those closed-cycle cooling water (CCW) system components that are exposed to raw water, which are the CCW heat exchanger tubes, tubesheet channels, and doors The GALL report recommends inspecting these components and other CCW system components, which are exposed to treated water and susceptible to loss of material. Explain this discrepancy between the Chemistry Control Program, as descriptions in Section 3 2 5 2 of Appendix B to the LRA and the AMP X1.M21 in the GALL report.

B 3 2.5 - 3 B 3 2 5 3 - 2

Corrosion may occur at locations in which contaminants may accumulate, such as a tank bottom. Ultrasonic thickness measurement of the tank bottom surface ensures that significant degradation is not occurring Identify the locations in the fuel oil components (e g , fuel oil tank bottoms) at which periodic fuel oil samples are obtained Indicate when thickness measurements are used to detect aging effects on the tank bottom

B 3 2 5 - 4 B 3 2.5 3 - 3

In Section 3 2 5 3 of Appendix B to the LRA, the applicant states that operating experience at St. Lucie Units 1 and 2 has included particulate contamination attributable to a contaminated tanker truck transfer pump and hose However, no instances of fuel oil system component failures attributable to contamination have been identified Discuss the corrective action taken to prevent recurrence. Also, discuss the operating experience regarding the effectiveness of the aging management program such that aging degradation, which could lead to the loss of an intended function, will be identified and addressed before it results in age-related failures of the fuel oil system components

B.3 2 8 - 1 B 3 2 8 - 3

In Section B 3 2 8, "Scope," of the LRA, the applicant states that the Fire Protection program will manage the aging effects of loss of material due to corrosion Provide justification for excluding loss of material due to micro-biologically influenced corrosion or biofouling of carbon steel and cast-iron components in fire-protection systems exposed to water.

In addition, clarify the information on page 3 3-11 of the LRA that indicates that the Fire Protection Program is consistent with the corresponding programs in the GALL report.

B 3 2.8 - 2 B 3 2.8 - 4

In Section B 3 2 8, "Parameters Monitored or Inspected," of the LRA, the applicant states that surface conditions are visually monitored Provide the percentage for each type of penetration seal that would be inspected during each refueling outage Also, provide the inspection frequencies for the visual and function tests of fire doors and seals.

B 3 2.8 - 3 B 3 2.8 - 5

Discuss your program for internal inspections of fire protection piping as stated in Chapter XI M27, "Fire Water Systems," of the Gall report Explain how the program will detect wall thinning due to internal corrosion Opening the system results in introducing oxygen, that may contribute to the initiation of general corrosion. Explain why the use of non-intrusive means of measuring wall thickness, such as ultrasonic inspection, are not used to manage this aging effect

B 3 2.8 - 4 B 3 2.8 - 6

Discuss the inspection activities that provide the reasonable assurance that the intended function of below grade fire protection piping will be maintained consistent with the current licensing basis for the period of extended operation

B 3.2 8 - 5 B 3 2 8 - 7

In Section B 3 2 8, "Operating Experience and Demonstrations," of the LRA, the applicant states that the Fire Protection Program has been subjected to periodic internal and external assessments. Discuss the significant recent enhancements as a result of these assessments. Indicate whether or not these enhancements have received NRC approval

B 3 2 8 - 6 B 3 2 8 - 8

The 50-year service life of sprinkler heads does not necessarily equal the 50th year of operation in terms of licensing. The service life is defined from the time the sprinkler system is installed and functional The staff interpretation, in accordance with National Fire Protection Agency (NFPA) 25, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," is that testing should be performed prior to 50 years of sprinkler system service life, not at year 50 of plant operation The staff position for this approach results in an applicant performing three such inspections over a 60-year period, the first before the end of the current operating term, the second after the 50-year sprinkler head testing, and the third after the first 10-year follow-up sprinkler head testing Discuss your inspection plans for the sprinkler heads during the current operating term, as well as during the period of extended operation.