



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
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ATLANTA, GEORGIA 30303-1257

November 30, 2017

Mr. Mano Nazar  
President and Chief Nuclear Officer  
Nuclear Division  
Florida Power & Light Company  
Mail Stop EX/JP  
700 Universe Blvd.  
Juno Beach, FL 33408

**SUBJECT: SAINT LUCIE PLANT, UNIT 2 – U.S. NUCLEAR REGULATORY COMMISSION  
POST-APPROVAL SITE INSPECTION FOR LICENSE RENEWAL, INSPECTION  
REPORT 05000389/2017009**

Dear Mr. Nazar:

On October 20, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed a Post-Approval Site Inspection for License Renewal at your Saint Lucie Plant, Unit 2, in accordance with NRC Inspection Procedure 71003. The enclosed report documents the inspection results, which were discussed on October 20, 2017 with members of the management staff.

Based on the inspection sample selected for review, the NRC inspectors did not identify any findings or violations of more than minor significance.

The inspectors determined that the overall implementation of aging management programs and time-limited aging analyses was consistent with the licensing basis of the facility. The inspectors also determined that the regulatory requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 54.37(b) were met, and commitment changes were evaluated and reported in accordance with the applicable requirements.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document

M. Nazar

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Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

Brian R. Bonser, Chief  
Engineering Branch 3  
Division of Reactor Safety

Docket No. 50-389  
License No. NPF-16

Enclosure:  
NRC Inspection Report 05000389/2017009  
w/Attachment: Supplemental Information

cc: Distribution via Listserv

SUBJECT: SAINT LUCIE PLANT, UNIT 2 – U.S. NUCLEAR REGULATORY COMMISSION  
 POST-APPROVAL SITE INSPECTION FOR LICENSE RENEWAL,  
 INSPECTION REPORT 05000389/2017009 dated November 30, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No: 05000389

License No: NPF-16

Report No: 05000389/2017009

Licensee: NextEra Energy

Facility: Saint Lucie Plant, Unit 2

Location: 6501 South Ocean Drive  
Jensen Beach, FL 34957

Dates: August 28 – October 20, 2017

Inspectors: P. Cooper, Reactor Inspector, Team Lead  
R. Carrion, Senior Reactor Inspector  
R. Williams, Senior Reactor Inspector  
B. Collins, Reactor Inspector  
M. Magyar, Construction Inspector  
S. Downey, Senior Reactor Inspector (in-training)

Approved by: Brian R. Bonser, Chief  
Engineering Branch 3  
Division of Reactor Safety

Enclosure

## SUMMARY

Inspection Report (IR) 05000389/2017009; 8/29/2017 – 10/20/2017; Saint Lucie Plant, Unit 2; Post-Approval Site Inspection for License Renewal

The report covers a team inspection conducted by six regional inspectors in accordance with the U.S. Nuclear Regulatory Commission (NRC) Inspector Manual Chapter 2515, and Inspection Procedure 71003.

This inspection resulted in no findings or violations of more than minor significance. On the basis of the sample selected for review, the inspectors determined that the licensee had completed, or was on track to complete, the necessary tasks to meet the license renewal commitments, license conditions, and regulatory requirements associated with the issuance of the renewed operating license at Saint Lucie, Unit 2. Based on the interviews with plant staff and the review of program documents and activities completed at the time of this inspection, the inspectors determined that the licensee had fully established the required aging management programs (AMPs), and time-limited aging analyses to manage the aging effects of in-scope structures, systems, and components (SSCs) through the period of extended operation of Unit 2, with the exception of the unresolved item discussed in this report.

The inspectors determined that the licensee took appropriate actions to ensure that newly identified SSCs within the scope of Title 10 of the *Code of Federal Regulations* (10 CFR) 54.37(b) were identified, and evaluated for management of aging affects. The inspectors did not identify significant inconsistencies between the description of the AMPs in the Updated Final Safety Analysis Report, as revised, and the aging management activities implemented by the licensee. The inspectors also determined that commitment changes were evaluated in accordance with the applicable requirements.

## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA5 Other Activities: Post-Approval Site Inspection for License Renewal (Phase 2)

##### .1 License Conditions and Commitments for License Renewal, Implementation of Aging Management Programs and Time-Limited Aging Analyses

###### a. Inspection Scope

The inspectors reviewed a sample of Aging Management Programs (AMPs), Time-limited Aging Analyses (TLAAs), and regulatory commitments associated with the renewed operating license for Saint Lucie, Unit 2, issued on October 2, 2003. This inspection took place prior to the period of extended operation (PEO) of Unit 2, which begins on April 6, 2023. The inspectors reviewed license renewal implementing documents, and conducted interviews with licensee staff, to verify that the licensee completed the necessary actions to: (a) comply with the conditions stipulated in the renewed facility operating license; (b) meet the commitments for license renewal described in NUREG-1779, "NRC Safety Evaluation Related to the License Renewal of the Saint Lucie Plant, Units 1 and 2," (ADAMS Accession Number ML032940205), and (c) implement the AMPs and TLAAs as described in the NRC Safety Evaluation Report (SER), and the license renewal supplement to the Updated Final Safety Analysis Report (UFSAR).

For those license renewal action items that were not completed at the time of this inspection, the team verified that there was reasonable assurance that such action items were on track for completion prior to the PEO, or in accordance with an established implementation schedule consistent with the license renewal application (LRA), the NRC SER and the UFSAR supplement. The inspectors discussed the unresolved item (URI), issued during the St. Lucie Unit 1, 71003 Phase 2 inspection (ML16004A248), for issues that required follow-up during future license renewal inspections.

The AMPs, associated commitments, and TLAAs selected for the inspection sample are summarized below based on their description in the UFSAR supplement for license renewal, as revised. The specific inspection activities conducted for each AMP, commitment, and TLAA, are also described below. Specific documents reviewed are listed in this report's Attachment.

UFSAR Section 18.1.1 Galvanic Corrosion Susceptibility Inspection Program & Commitment #1: The UFSAR states that the Galvanic Corrosion Susceptibility Inspection Program manages the aging effect of loss of material due to galvanic corrosion on the surfaces of susceptible piping and components. The commitment specified that, prior to the PEO of Unit 2, the licensee would perform inspections to determine if galvanic corrosion is active in systems where it is not expected. The program would involve selected one-time inspections of the surfaces of piping and components with the greatest susceptibility to galvanic corrosion. Baseline examinations (visual inspection or volumetric examinations) in the selected systems would be performed and evaluated to establish if the corrosion mechanism were active. Based on the results of these inspections, follow-up examinations or the need for programmatic corrective actions would be determined. The inspectors reviewed the

program basis documents along with administrative and implementing procedures, to verify that the program was developed as described in the LRA and the corresponding NRC SER.

The inspectors reviewed the guidance provided in SPEC-M-098, "Galvanic Corrosion Susceptibility Inspection Program," to verify that the selection of inspection locations was consistent with the program scope. The inspectors interviewed licensee personnel and reviewed a sample of inspection results, to verify that the examinations and the evaluation of results were performed in accordance with the licensing basis. The results of the licensee's inspections determined that no follow-up examinations or programmatic corrective actions were required. Based on these results, the inspectors reviewed a sample of evaluations to determine whether the licensee's conclusions were consistent with the program attributes as described in the licensing basis documents.

UFSAR Section 18.1.2 Pipe Wall Thinning Inspection Program & Commitment #2: The Pipe Wall Thinning Inspection Program manages the aging effect of localized loss of material due to erosion of the internal surfaces of stainless steel Auxiliary Feedwater (AFW) system piping downstream of the recirculation orifices, and carbon steel component cooling water (CCW) system piping associated with control room air conditioning. The commitment specified that, prior to the PEO of Unit 2, the licensee would perform examinations using volumetric techniques of the internal surfaces of stainless steel AFW piping downstream of the recirculation orifices. Initial examinations were intended to inform the schedule of future examinations into the PEO. The UFSAR description of this AMP specified that examination techniques used would include ultrasonic testing (UT) or radiography (RT).

The inspectors reviewed program basis documents, administrative and implementing procedures, to verify that the program was developed as described in the LRA, and the corresponding NRC SER. The inspectors interviewed licensee personnel to discuss the implementation of the program, and verified that program procedures accomplished the actions as described in the commitment. The inspectors also reviewed a sample of nondestructive examinations (NDEs) of AFW components in Unit 2 to verify that the examinations and evaluations of results were performed in accordance with the program implementing procedures. Based upon the results of completed Unit 2 examinations, the licensee plans to reinspect the Unit 2 piping downstream of S0-09-3, 4 and 5 in three cycles (SL2-26) to further support the development of long term inspection frequencies.

UFASR Section 18.1.4 Small Bore Class 1 Piping Inspection Program, Commitment 5, & Commitment #6: The UFSAR states that one-time volumetric inspection of a sample of small bore Class I piping and nozzles would be performed to determine if cracking is an aging effect requiring management during the period of extended operation. Based on the guidance provided in the NUREG-1801, Rev. 2, Section XI.M35, a destructive examination may be performed in lieu of the volumetric examination. The UFSAR further stated that for each socket weld that was destructively examined, credit may be taken as being equivalent to volumetrically examining two socket welds. This one-time inspection would address Class I piping less than 4 inches nominal pipe size (less than NPS 4) and greater than or equal to NPS 1.

Commitment 5 specified that, prior to the PEO of Unit 2, the licensee would submit a report to the NRC, for review and approval, summarizing the inspection plan for small bore Class 1 piping prior to implementation. This inspection plan would describe the risk-

informed methodology, and would establish the minimum number and locations of small bore piping full penetration butt welds to be volumetrically examined. The risk-informed methodology; however, would not be a basis to eliminate volumetric examination of welds. Commitment 6 specified that the licensee would perform the planned volumetric inspections of a sample of small bore Class 1 piping prior to the PEO of Unit 2.

On March 29, 2016, the licensee submitted Letter L-2016-063 to the NRC for review and approval. The letter included the inspection plan and committed to follow the guidance provided in NUREG-1801, Rev. 2, Section XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping." Prior to submittal of the inspection plan, commitment changes were submitted to the NRC via letters L-2014-059 and L-2015-126. These letters first committed to NUREG-1801, Rev. 2, Section XI.M35, and then revised the commitment to allow an opportunistic destructive exam on a butt weld instead of requiring a volumetric examination.

The inspectors reviewed program basis documents, administrative and implementing procedures, correspondence between the licensee and NRC, and work orders (WOs) to verify that the program was developed and executed with the criteria described in the LRA, and the corresponding NRC SER. The inspectors interviewed licensee personnel to discuss the selection process associated with the number and locations of the volumetric examinations of Class 1 small bore piping samples. The inspectors then verified that the licensee had completed the minimum number of volumetric examinations as described in the program, and associated correspondence to the NRC. The results of the licensee's destructive and volumetric examinations determined that no follow-up examinations or programmatic corrective actions were required. Based on these conclusions, the inspectors reviewed the results of the volumetric examinations to verify that the disposition of results was consistent with the program elements, as described in the licensing basis documents.

UFSAR Section 18.1.5 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program & Commitment #7: The UFSAR states that the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program will include a determination of the susceptibility of Class 1 CASS piping components to thermal aging embrittlement and will provide for the subsequent aging management of those components that have been identified as being potentially susceptible. For potentially susceptible components, aging management would be accomplished through NDEs and/or flaw tolerance evaluations. The commitment specified that the licensee would implement the Thermal Aging Embrittlement of CASS Program prior to the PEO of Unit 2. The program would manage the reduction of fracture toughness due to thermal aging embrittlement of CASS in susceptible reactor coolant system (RCS) pressure boundary components.

The version of the UFSAR supplement for license renewal approved by the NRC staff in the final SER stated that the program was consistent with the ten attributes of program XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel," specified in the initial GALL Report (dated April 2001). On October 3, 2014, the licensee submitted letter L-2014-304 to the NRC (ADAMS Accession Number ML14294A448) stating that it will follow the guidance in Rev. 2 of the GALL Report. The licensee opted to manage thermal aging embrittlement through flaw tolerance evaluations of susceptible components, as outlined by Rev. 2 of the GALL Report. The UFSAR was revised to state that the program is consistent with the ten attributes of program XI.M12 as described in Rev. 2 of the GALL Report.



The inspectors reviewed the license renewal program basis documents, administrative and implementing procedures, and scoping basis documents to determine if the program scope was developed as described in the LRA, the corresponding NRC SER, and post-approval correspondence submitted to the NRC. The inspectors also interviewed licensee personnel to discuss the selection and evaluation process for components within the scope of the program, and verified that program procedures included appropriate guidance to evaluate CASS locations. Specifically, the inspectors reviewed a flaw tolerance evaluation to verify that percent ferrite determinations were consistent with the scoping criteria in the GALL Report, Rev. 2. The inspectors reviewed a sample of the flaw tolerance evaluation results documented in procedure ADM-17.36, "Cast Austenitic Stainless Steel Aging Management Program," and verified that the limiting locations identified were evaluated for the PEO.

UFSAR Section 18.1.6 Containment Cable Inspection Program & Commitment #17: The UFSAR program description specified that the Containment Cable Inspection Program will manage the potential aging of non-EQ cables and connections, including non-EQ cables and connections associated with sensitive low-level signal circuits. The program consists of periodic visual inspection of accessible non-EQ cables and connections within the scope of license renewal located in the containment that may be installed in adverse localized environments and review of calibration test results that may indicate age-related degradation of cables associated with the neutron detectors. The program stated that these activities would be implemented prior to the end of the initial operating license term for St. Lucie Unit 2.

The inspectors reviewed the licensing basis, program basis documents, administrative and implementing procedures to verify that the program was developed as described in the license renewal application and the corresponding NRC Safety Evaluation Report. The inspectors interviewed licensee personnel to discuss the results of tests and inspections that had been completed.

The status of administrative action items associated with the implementation of this commitment was considered completed for Units 1 and 2 in the licensee's CAP.

UFSAR Section 18.2.1 Alloy 600 Inspection Program & Commitment #8: The UFSAR states that the Alloy 600 Inspection program manages the aging effect of cracking due to primary water stress corrosion (PWSCC) for susceptible Alloy 600 components within the Reactor Coolant System (RCS) pressure boundary. The commitment states that the Alloy 600 Inspection Program will implement FPL commitments in response to NRC communications associated with primary water stress corrosion cracking (PWSCC) of Inconel materials (including Alloy 600 and Alloy 182/82 materials). In addition, this program will be maintained consistent with the recommendations of the Combustion Engineering Owners Group (CEOG), Nuclear Energy Institute (NEI), and Electric Power Research Institute (EPRI) Material Reliability Program (MRP). The UFSAR description noted that several of the Alloy 600 components in service at the time of the LRA submittal and issuance of the SER had been mitigated by replacement with Alloy 690 components. The inspectors reviewed the program basis documents, administrative and implementing procedures, commitment change packages, and corrective action documents to verify that the program was developed as described in the LRA and corresponding NRC SER. The inspectors interviewed licensee personnel to discuss implementation of the program, and verified that program procedures accomplished the actions described in the commitment.

UFSAR Section 18.2.2.1 ASME Section XI, Subsection IWB, IWC, IWD Inservice Inspection Program and Commitment #9: The UFSAR describes the ASME Section XI, Subsections, IWB, IWC, and IWD Inservice Inspection Program as a program that manages the aging effects of loss of material, cracking, loss of preload, reduction in fracture toughness, and loss of mechanical closure integrity for Class 1, 2, and 3 component and piping. The UFSAR also states that ASME Section XI, Subsections, IWB, IWC, and IWD Inservice Inspection Program is consistent with the 10 attributes of Program XI.M1, "ASME Section XI Inservice Inspections, Subsections IWB, IWC, and IWD" specified in the GALL Report , Rev. 0, with some clarifications regarding ASME Code Case N-509.

As described in the St. Lucie SER appendix D, the licensee committed to enhancing the ASME Section XI, Subsections, IWB, IWC, and IWD Inservice Inspection Program to include the following: (a) perform VT-1 inspections of the core stabilizing lugs and core support lugs, and (b) evaluate pressurizer surge line flaws (if identified) with regard to environmentally assisted fatigue. These enhancements are to be completed prior to the end of the initial operating license term.

For the programmatic review, the inspectors reviewed the program basis document, ISI Program plan and schedule, recent program health reports, a sample of implementing procedures, and a sample of CAP documents to verify the program was implemented in accordance with the licensing basis.

For the first enhancement, the inspectors verified that the current Unit 2 fourth interval ISI plan summary included VT-1 visual inspections of the core stabilizing lugs and core support lugs, and that the program made reference to the corresponding regulatory commitment for license renewal. In addition, the inspectors reviewed the exam report that showed completion of the VT-1 inspections during the SL2-20 refueling outage.

For the second enhancement, the inspectors reviewed the current Unit 2 fourth interval ISI plan summary sheets associated with welds on the pressurizer surge line to determine if the requirement for an evaluation considering environmentally assisted fatigue issues had been included in the program. The inspectors reviewed a sample of future examinations of the pressurizer surge line welds included in the ASME BPVC Section XI, ISI program, to verify that the program contained instructions to evaluate environmentally assisted fatigue in newly identified flaws.

UFSAR Section 18.2.2.2 – ASME Section XI, Subsection IWE, Inservice Inspection Program: The UFSAR described the ASME Section XI, Subsection IWE, Inservice Inspection program as an existing program that manages the aging effects of loss of material and loss of seal. The program provides for inspection and examination of containment surfaces, pressure retaining welds, seals, gaskets and moisture barriers, pressure-retaining bolting, and pressure retaining components in accordance with the requirements of ASME Section XI, Subsection IWE. The UFSAR stated that the program is consistent with the ten attributes of aging management programs XI.S1, "ASME Section XI, Subsection IWE," and XI.S4, "10 CFR Part 50 Appendix J," specified in the GALL Report, Rev. 0.

The inspectors reviewed the program basis document, the inservice inspection program plan, recent program health reports, and a sample of implementing procedures, to verify that the program was implemented in accordance with the licensing basis. The inspectors also reviewed a sample of inservice inspection summary reports to verify that inspections were performed in accordance with ASME Section XI requirements.

UFSAR Section 18.2.2.3 – ASME Section XI, Subsection IWF, Inservice Inspection Program: The UFSAR described the ASME Section XI, Subsection IWF, Inservice Inspection Program as an existing program that manages the aging effect of loss of material. The program provides for inspection and examination of accessible surface areas of the component supports in accordance with the requirements of ASME Section XI, Subsection IWF. The UFSAR stated that the program is consistent with the ten attributes of aging management program XI.S3, “ASME Section XI, Subsection IWF,” specified in the GALL Report, Rev. 0.

The inspectors reviewed the program basis document, the inservice inspection program plan, recent program health reports, and a sample of implementing procedures, to verify that the program was implemented in accordance with the licensing basis. The inspectors also reviewed a sample of inservice inspection summary reports to verify that inspections were performed in accordance with ASME Section XI requirements.

UFSAR Section 18.2.4 Chemistry Control Program: The UFSAR described the Chemistry Control Program as an existing program that manages the aging effects of loss of material, cracking, and fouling for primary and secondary systems, closed cooling water, and fuel oil SSCs. The Chemistry Control Program consisted of three subprograms: the Water Chemistry Control Sub program; the Closed-Cycle Cooling Water System Chemistry Sub program; and the Fuel Oil Chemistry Subprogram. The UFSAR stated that the Water Chemistry Control Sub program is consistent with the ten attributes of Program XI.M2, “Water Chemistry Control,” and that the Closed Cycle Cooling Water System Chemistry Sub program is consistent with the ten attributes of Program XI.M21A, “Closed-Cycle Cooling Water System Chemistry,” specified in the GALL Report, Rev. 2, with some exceptions related to the inspection of in-scope components. The UFSAR also stated that the Fuel Oil Chemistry Control Subprogram is plant-specific.

The inspectors reviewed the program basis document, recent program health reports, a sample of implementing procedures, and a sample of CAP documents to verify that the program was implemented in accordance with the licensing basis. The inspectors interviewed licensee personnel to discuss the implementation of the program as described in the UFSAR. The inspectors also reviewed a sample of chemistry trending data to verify that chemistry parameters were monitored in accordance with the applicable program procedures and industry standards. The inspection sample included maintenance procedures and ARs associated with the CCW system to verify that they contained instructions to inspect for aging effects when component disassembly is performed. The inspectors verified that aging management activities were consistent with licensing basis documents and program procedures.

UFSAR Section 18.2.5 & UFASR Section 18.3.3 (TLAA) Environmental Qualification Program: The UFSAR program stated that for those passive components where analysis cannot justify a qualified life in excess of the period of extended operation, then the components parts would be replaced, refurbished, or requalified prior to exceeding their qualified lives. The TLAA specified that for equipment covered by the existing Environmental Qualification (EQ) Program – required by 10 CFR 50.49 – analyses would be performed to evaluate if the existing environmental qualification aging analyses could be projected to the end of the PEO. This TLAA applied to equipment which was initially qualified for a 40-year qualified life or greater. During the NRC inspection of Unit 1 aging management programs, it was noted that the existing Environmental Qualification (EQ) program was not credited as an aging management program and EQ-related aging was addressed strictly through a Time-Limited Aging Analysis (TLAA). The site has since evaluated this approach and has taken actions to credit the existing EQ program to supplement the TLAA.

The inspectors reviewed the licensing basis, program basis documents, and calculations and discussed these with licensee personnel to verify the TLAA's were addressed as described in the LRA and the corresponding NRC SER.

UFSAR Section 18.2.6 Fatigue Monitoring Program & Commitment #11: The UFSAR describes the Fatigue Monitoring Program as a confirmatory program that is designed to track accumulated design cycles to ensure RCS components remain within their design fatigue limits. The specific fatigue analyses validated by the program are associated with the reactor vessel, reactor vessel internals, pressurizer, steam generators, reactor coolant pumps, and Class 1 RCS piping.

As described in the St. Lucie SER appendix D, the licensee committed to revising procedures to provide guidance in the event fatigue design cycle limits are approached. This commitment is to be completed prior to the end of the initial operating license term.

The inspectors reviewed program basis documents, corrective action documents, and administrative and implementing procedures to verify that the program was revised and continues to be implemented as described in the LRA and corresponding NRC SER. The inspectors interviewed licensee personnel to discuss the monitoring, trending, and recording of fatigue cycles, as well as actions that would take place should the accumulated cycle count reach 80 percent of any design cycle limit as described in the commitment.

UFSAR Section 18.2.7 Fire Protection Program & Commitment #12: The UFSAR states that the fire protection program manages the aging effect of loss of material for the components of the Fire Protection System. This program manages the aging effect of loss of material for structural components associated with fire protection. As described in the St. Lucie SER appendix D, the licensee committed to incorporating NFPA-25 testing of wet pipe sprinklers into the fire protection program.

The inspectors reviewed the program basis documents, administrative and implementing procedures, and corrective action documents to verify that the program was developed as described in the LRA and corresponding NRC SER. The inspectors also reviewed the commitment change to incorporate the option of replacing the sprinkler heads in lieu of testing. The inspectors interviewed licensee personnel to discuss implementation of

the program, and verified that program procedures accomplished the actions described in the commitment.

UFSAR Section 18.2.8 Flow-Accelerated Corrosion Program & Commitment #13: The UFSAR describes the Flow-Accelerated Corrosion (FAC) program as a program that manages the aging effect of loss of material due to FAC by predicting, detecting, monitoring, and mitigating FAC in high energy carbon steel piping associated with the Main Steam, Reactor Coolant (Steam Generators), Main Feedwater, and Steam Generator Blowdown Systems. The UFSAR also states that the FAC Program is consistent with the 10 attributes of Program XI.M17, "Flow-Accelerated Corrosion" specified in the GALL report, Rev. 0. The program will utilize analysis and baseline inspections; determination, evaluation, and corrective actions for components; and follow-up inspections.

As described in the St. Lucie SER appendix D, the licensee committed to expanding the scope of the FAC program to include the internal and external loss of material of selected steam traps. This commitment is to be completed prior to the end of the initial operating license term.

The inspectors reviewed the program basis documents, administrative and implementing procedures, and corrective action documents to verify that the program was developed as described in the LRA and corresponding NRC SER. The inspectors interviewed licensee personnel to discuss implementation of the program, and verified that program procedures accomplished the actions described in the commitment. In addition, the inspectors reviewed a sample of work orders and NDEs of steam trap lines in Unit 2 to verify that the examination and evaluation of results, were performed in accordance with program implementing procedures.

UFSAR Section 18.2.9 – Intake Cooling Water System Inspection Program: The UFSAR described the Intake Cooling Water (ICW) inspection program as an existing program that manages the aging effects of loss of material due to various corrosion mechanisms, and particulate and biological fouling for ICW system components, and the ICW side of the CCW heat exchangers. It includes inspections, performance testing, evaluations, and corrective actions performed as a result of licensee commitments in response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." Generic Letter 89-13 recommended, in part, the implementation of an on-going program of surveillance and control techniques to significantly reduce the incidence of flow blockage caused by biological fouling, corrosion, erosion, protective coatings failures, and silting in systems and components supplied by intake cooling water.

The inspectors reviewed program basis documents, administrative and implementing procedures, and system health reports to verify that the program was developed and implemented as described in the UFSAR, LRA, and the corresponding NRC SER. The inspectors also conducted a walk down to assess the material condition of accessible SSCs associated with the ICW system, including the intake structure, traveling screens, strainers, pumps, piping, and component supports. The inspectors interviewed licensee personnel to discuss the system health, inspection frequency, program effectiveness, and associated corrective actions. The inspectors reviewed a sample of WOs and reviewed the results of the inspections, to verify that appropriate actions were performed based on the conclusions reached from the inspection.

UFSAR Section 18.2.11 Reactor Vessel Integrity Program and Commitment #15: The UFSAR states that the Reactor Vessel Integrity Program manages reactor vessel irradiation embrittlement. It encompasses four subprograms that make up the Reactor Vessel Integrity Program. The four subprograms are the Reactor Vessel Surveillance Capsule Removal and Evaluation, Fluence and Uncertainty Calculations, Monitoring Effective Full Power Years, and Pressure-Temperature Limit Curves programs.

As described in the St. Lucie SER Appendix D, the licensee committed to enhance program documents to integrate all aspects of the four subprograms. This commitment is to be completed prior to entering the PEO.

At the time of the inspection, the licensee was in the process of revising the Reactor Vessel P-T limit curves in response to the material testing results of the most recent surveillance capsule. This item is currently under NRC review and the licensee has stated that until the P-T limit curve analysis is completed and approved, that the current P-T limit curves of the Technical Specifications will be limited to 31.98 Effective Full Power Years.

The inspectors reviewed the program basis documents, administrative and implementing procedures, and corrective action documents to verify that the program was developed as described in the LRA and corresponding NRC SER. The inspectors interviewed licensee personnel to verify that design assumptions had not changed since the review of the LRA and verified that program procedures accomplished the actions described in the commitment.

UFSAR Section 18.2.12 Steam Generator Integrity Program: The UFSAR states that The Steam Generator Integrity Program manages the aging effects of cracking and loss of material. The program ensures that steam generator integrity is maintained under normal operating, transient, and postulated accident conditions. Additionally, it states that the program is consistent with the ten attributes of the XI.M19, "Steam Generator Tube Integrity," specified in NUREG-1801, GALL Report (April 2001).

The inspectors reviewed the program basis documents, administrative and implementing procedures, and corrective action documents to verify that the program was developed as described in the LRA and corresponding NRC SER. The inspectors interviewed licensee personnel to discuss the implementation of the program as described in the UFSAR.

UFSAR Section 18.2.13 Systems and Structures Monitoring Program & Commitment #16: The UFSAR states that the Systems and Structures Monitoring Program manages the aging effects of loss of material, cracking, loss of seal, and change in material properties. The program provides for periodic visual inspection and examination for degradation of accessible surfaces of specific systems, structures, and components, and corrective actions, as required, based on these inspections. As described in the St. Lucie SER Appendix D, the licensee committed to enhancing the program to provide guidance for managing the aging effects of inaccessible concrete, inspection of insulated equipment and piping, and evaluating masonry wall degradation and uniform corrosion. These enhancements will be made prior to the end of the initial operating license term for St. Lucie Unit 2.

The inspectors reviewed program basis documents, administrative and implementing procedures, and license renewal drawings to verify that the program was enhanced as described in the LRA, and the corresponding NRC SER. The inspectors interviewed licensee personnel to discuss the scope of the program, and verified that the results of the inspections outlined in the commitment were consistent with the licensing basis. The inspectors reviewed the results of the latest program walk-downs to verify that the evaluation of results was performed in accordance the program's implementing procedures. The inspectors also conducted a walk-down to assess the material condition of accessible SSCs within the scope of the Systems and Structures Monitoring Program, including structures such as the Turbine Building, Containment, Component Cooling Water Areas, Intake Structures, and Emergency Diesel Generator Buildings.

UFSAR Section 18.3.2 Metal Fatigue: The UFSAR identifies plant mechanical equipment with thermal and mechanical fatigue analyses as TLAA's for St. Lucie Unit 2. The Metal Fatigue TLAA includes the following: (a) ASME Section III, Class 1 Components; (b) ASME Section III, Class 2 and 3 and ANSI B31.1 Components; and (c) Environmentally Assisted Fatigue. In general, each analysis was based on reviewing the transient cycle assumptions used for the initial license period and reassessing them for the PEO to ensure that components would not exceed design limits or would be monitored appropriately to prevent it. In combination with the continued actions described in the Fatigue Monitoring Program, the analyses concluded that fatigue would be adequately managed throughout the PEO.

The inspectors interviewed licensee personnel, and reviewed the licensing basis and TLAA implementing documents to verify that the TLAA was developed as described in the LRA and the corresponding NRC SER.

UFSAR Section 18.3.2.3 Environmentally Assisted Fatigue of the Pressurizer Surge Line and Commitment #18: The UFSAR description specified that the Environmentally Assisted Fatigue of the Pressurizer Surge Line would be addressed through a TLAA approach. The commitment specified that the licensee would address environmentally-assisted fatigue of the Unit 2 pressurizer surge line using calculations contained in NUREG/CR-6583, "Effects of LWR Coolant Environments on Fatigue Design Curves of Carbon and Low-Alloy Steels," March 1998, or NUREG/CR-5704, "Effects of LWR Coolant Environments on Fatigue Design Curves of Austenitic Stainless Steels," April 1999, as appropriate. The UFSAR description stated that based on the results of those calculations, all component locations were determined to be acceptable for the period of extended operation, with the exception of the pressurizer surge line (specifically the surge line elbow below the pressurizer). The UFSAR description stated, therefore, that environmentally assisted fatigue of the surge line will be accomplished by a combination of flaw tolerance analysis as per ASME Boiler & Pressure Vessel Code, Section XI, 2001 Edition, with Addenda through 2003, Appendix L and inspection under the PSL Inservice Inspection Program. Finally, the UFSAR description stated that during the PEO, these surge line welds will be examined in accordance with ASME Section XI, IWB for Class 1 welds, and that these examinations would be managed by the Pressurizer Surge Line Aging Management Program.

The inspectors reviewed the licensing basis, program basis documents, and program implementing documents to verify that the program was developed as described in the LRA and the corresponding NRC SER. The inspectors interviewed licensee personnel

to discuss the implementation of the program and verified that program procedures accomplished the actions described in the commitment.

UFSAR Section 18.3.4 Containment Penetration Fatigue: The FSAR description specified that Containment Penetration Fatigue would be addressed through a TLAA approach. Specifically, five categories of containment penetrations were identified, and the licensee provided justification for the Unit 2 penetrations in each category.

The inspectors reviewed the licensing basis and TLAA implementing documents to verify that the TLAA was developed as described in the license renewal application and the corresponding NRC Safety Evaluation Report.

UFSAR Section 18.3.6 Crane Load Cycle Limit: The UFSAR description specified that the Crane Load Cycle Limit would be addressed through a TLAA approach. Specifically, the following eight cranes were identified where fatigue analysis must be performed:

- Reactor Building Polar Crane
- Refueling Machine and Hoist
- Reactor Containment Building Auxiliary Telescoping Jib Crane
- Fuel Transfer Machine
- Spent Fuel Handling Machine
- Refueling Canal Bulkhead Monorail
- Cask Storage Pool Bulkhead Monorail
- Intake Structure Bridge Crane

The FSAR description also stated that the actual usage over the projected life through the period of extended operation would be far less than the analyzed quantity of cycles, and the TLAA implementation documentation supported such a claim.

The inspectors reviewed the licensing basis and TLAA implementing documents to verify that the TLAA was developed as described in the LRA and the corresponding NRC SER.

b. Findings

No findings were identified. On the basis of the sample selected for review, the inspectors determined that the licensee had completed, or was on track to complete, the necessary tasks to meet the license renewal commitments, license conditions, and regulatory requirements associated with the issuance of the renewed operating license at Saint Lucie Unit 2. Based on the interviews with plant staff, and the review of program documents and activities completed at the time of this inspection, the inspectors determined that the licensee had fully established the required AMPs and TLAAs to manage the aging effects of in-scope SSCs through the PEO of Unit 2, with the exception of the URI discussed below.

The URI, identified during the St. Lucie 71003 Phase 2 inspection, is discussed in Item 1 below, and requires follow-up during future license renewal inspections to obtain reasonable assurance that the license renewal commitments are met, and that the aging effects of affected SSCs would be managed during the PEO. The inspectors also identified various observations associated with the implementation of certain AMPs and TLAAs, as described in Item 2 below.



1) (Discussed) Unresolved Item 05000335/2015010-001, Implementation of Commitments and Aging Management Programs

Introduction: The inspectors identified a URI, during the St. Lucie 71003 Phase 2 inspection, associated with the implementation status of various commitments and AMPs.

Description: The inspectors previously identified pending actions for various regulatory commitments/AMPs as a result of commitment changes implemented by the licensee after the renewed operating license was issued. The licensee informed the NRC of such changes, and submitted correspondence to the NRC for review and approval. At the time of this inspection, although many of the previously identified items have been resolved, the NRC was still in the process of reviewing one the licensee's submittals. While the licensee met its commitment to submit the proposed changes to the NRC prior to the PEO, the inspectors were unable to determine whether the licensee's implementation of this affected AMPs was consistent with the staff's final position, which will be provided through the issuance of SERs. Updates to the previously identified commitment items, and either their respective pending actions or solutions, are summarized below.

- Commitment 1, Condensate Storage Tank Cross-Connect Buried Piping Inspection – On May 12, 2015 (ML 15146A055), the licensee informed the NRC of a commitment change based on the as-found configuration of the cross-tie line after excavation. On September 1, 2015 (ML15237A418), the NRC issued a Request for Additional information, for which the licensee provided a response on October 6, 2015 (ML15301A252). On January 19, 2016 (ML15356A650), the NRC issued a SER accepting the commitment change and requiring no follow-up actions.
- Commitments 4 and 5, Reactor Vessel Internals Inspection Program – On June 14, 2011 (Letter No. L-2011-556), the licensee informed the NRC of a commitment change from the previously approved St. Lucie RVI AMP to the NRC approved MRP-227-A. On September 28, 2015 (ML15399A574) the licensee submitted the RVI Inspection plan which contained the summary of aging effects on reactor vessel internals components, and addressed the incorporation of responses to NRC RAIs. On July 3, 2017 (Letter No. L-2017-119) the licensee submitted the most recent response to the NRCs request for additional information. At the time of this inspection, the NRC was reviewing the licensee's submittals and no final SER had yet been issued.
- Commitment 6, Small Bore Class 1 Piping Inspection Program – On May 11, 2015 (ML15140A394), the licensee submitted a Rev. to the previously approved Small Bore Class 1 Piping Inspection Program for NRC review and approval. The Rev. was related to the use of destructive examinations in lieu of volumetric examinations. On December 23, 2015 (ML15321A153), NRC issued a SER accepting the commitment change and requiring no follow-up actions.
- Commitment 20, Environmentally-Assisted Fatigue of the Pressurizer Surge Line On October 29, 2015 (ML15314A160), the licensee submitted its proposed program for managing environmentally-assisted fatigue of the pressurizer surge line to the NRC. The inspectors noted that the proposal detailed the licensee's intent to utilize the

ASME BPVC, Section XI ISI Program (UFSAR Section 18.2.2) to manage the recurring inspections, and the associated evaluations for any flaws noted. On October 13, 2016 (ML16235A138), NRC issued a SER accepting the commitment change and requiring no follow-up actions.

In addition to the commitment changes under NRC review, the inspectors identified a follow up item for Unit 1, Commitment #17, "Reactor Vessel Integrity Program." The inspectors noted that the licensee credited fleet procedure ER-AA-110 to meet the regulatory commitment associated with the integration of all four reactor vessel integrity subprograms into a single program document. Fleet procedure ER-AA-110 requires a plant-specific procedure be developed for each site describing the important parameters needed to meet the regulatory requirements specific to that station. The inspectors reviewed AR 02094578 and the plant-specific procedure for Unit 1, administrative procedure ADM-17.38, issued on February 9, 2016, and found all pending actions to be complete.

The inspectors determined that it was necessary to keep this URI open to further review the implementation of Commitments 4 and 5 for the Reactor Vessel Internals Inspection Program, and verify that the commitments will be met as approved by the NRC in the final SER. This issue requires follow up inspection, and will continue to be tracked as URI 05000335/2015010-001, "Implementation of Commitments and Aging Management Programs."

- 2) Observations for Aging Management Programs: The inspectors identified various observations associated with the implementation of certain AMPs and TLAAs. The observations involved issues of minor significance that were captured in the CAP documents (i.e., ARs) listed below for evaluation and resolution. Therefore, these observations are not subject to enforcement action in accordance with the NRC Enforcement Policy.

- AR 02231220 – Fire Protection – Combustible materials
- AR 02231590 – FAC Program – Nominal pipe wall thickness
- AR 02231602 – Update of Programs to GALL Rev. 2
- AR 02232752 – Structures and Systems Monitoring – Rust stains on concrete ceiling
- AR 02232951 – Structures and Systems Monitoring – Corrosion of CWST
- AR 02233035 – Structures and Systems Monitoring – Trash pit pipe support
- AR 02233037 – Structures and Systems Monitoring – Corrosion on electrical enclosures
- AR 02233178 – Structures and Systems Monitoring – Concrete spalling on Containment Shield Building
- AR 02233208 – Fire Protection – Corrosion of TWST piping support
- AR 02233237 – Fire Protection – Support on TWST piping

.2 Newly Identified Structures, Systems, and Components

a. Inspection Scope

The inspectors discussed the evaluation of newly identified SSCs with the licensee to verify compliance with the provisions of 10 CFR 54.37(b). The inspectors reviewed a licensee evaluation (EC-289276) performed to determine whether newly identified SSCs

existed. Where applicable, the inspectors verified that aging management review was performed for any newly identified SSC in accordance with 10 CFR 54.37(b).

b. Findings

The inspectors identified an observation associated with the implementation of 10 CFR 54.37(b). Specifically, the observation is associated with the in-process implementation of NFPA-805. The observation was captured in the CAP as AR 02214630. On the basis of the sample selected for review, the inspectors determined that the licensee had the administrative controls to ensure newly identified SSCs were identified and evaluated for management of aging affects.

.3 Description of Aging Management Programs in the UFSAR Supplement

a. Inspection Scope

As part of the review of implementation activities for the selected AMPs and TLAAs described in Section 4OA5.1.a of this report, the inspectors reviewed the corresponding UFSAR sections to verify that the program descriptions were consistent with the LRA, and the corresponding section of the NRC SER. The inspectors reviewed three versions of the UFSAR supplement for license renewal as follows:

- The inspectors reviewed the UFSAR supplement submitted with the LRA, as revised, to identify the program attributes and future inspection activities that were originally relied upon for the approval of the renewed operating license.
- The inspectors reviewed the Rev. of the UFSAR submitted to the NRC, pursuant to the requirements in 10 CFR 50.71(e)(4), following the issuance of the renewed operating license (i.e., Amendment 15, dated December 2003) to verify that the UFSAR supplement for license renewal was included with the UFSAR as required by the condition of the renewed operating license.
- The inspectors reviewed the latest Rev. of the UFSAR supplement for license renewal (i.e., Amendment 23, dated April 2016) to verify that the program attributes and inspection activities were consistent with the AMPs as originally approved by the NRC, and subsequent Revisions performed under the provisions of 10 CFR 50.59. The inspectors also verified that newly identified SSCs, if any, were included in the UFSAR supplement.

b. Findings

No findings were identified. The inspectors determined that the UFSAR supplement, as revised, was incorporated into the UFSAR. Additionally, the inspectors determined that there were no significant discrepancies between the UFSAR supplement description and the AMPs/TLAAs being implemented.

.4 Changes to License Renewal Commitments and the UFSAR Supplement for License Renewal

a. Inspection Scope

As part of the review of license renewal commitments, AMPs, and TLAs described in section 4OA5.1.a of this report, the inspectors reviewed a sample of license renewal commitment change documents to verify that the licensee followed the guidance in Nuclear Energy Institute 99-04, "Guidelines for Managing NRC Commitment Changes," for any change to the commitments, including their elimination. The inspectors verified that the licensee properly evaluated, reported, and approved where necessary, changes to license renewal commitments listed in the UFSAR in accordance with 10 CFR 50.59.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On October 20, 2017, the inspectors presented the inspection results to Mark Wolaver, Engineering Program Manager, and members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

P. Atkinson, License Renewal Implementation Project Manager  
B. DiVentura, License Renewal Implementation  
D. Patel, License Renewal Implementation  
S. Sharma, License Renewal Implementation

**LIST OF REPORT ITEMS**

Opened/Closed

None

Discussed

None

## LIST OF DOCUMENTS REVIEWED

### UFSAR Section 18.1.1 Galvanic Corrosion Susceptibility Inspection Program

AR 2202825, Perform engineering evaluation for LR galvanic inspections  
EC-289222, Galvanic Corrosion Susceptibility Inspection Program License Renewal Basis Document, Rev. 0  
EN-AA-106-1002, Unit-2 Book #1 Galvanic Corrosion Susceptibility Inspection Program  
GIR 17-014, AFW Pump 2B BF-43 UTT Galvanic  
NDE 4.1, Visual Examination VT-1 Welds/Bolting/Bushing/Washers, Rev. 14  
NDE 5.18, Ultrasonic Thickness Measurement, Rev. 8  
NDE 5.28, Digital Thickness Measurement, Rev. 1  
SPEC-M-098, Galvanic Corrosion Susceptibility Inspection Program, Rev. 0

### UFSAR Section 18.1.2 Pipe Wall Thinning Inspection Program

AR 00445813, Determine future inspection interval for piping downstream of AFW orifices  
AR 02044050, Piping downstream of the AFW recirculation orifices has the potential for through-wall leakage due to cavitation/jet impingement  
AR 02196853, Establish reinspection interval for PSL-2 AFW piping downstream of recirculation orifices 50-09-3, 50-09-4 and S0-09-5 in accordance with PSL-ENG-LRAM-00-114  
CR 03-1345, Inspection performed as part of the Pipe Wall Thinning Program of the Unit 2 AFW piping downstream of recirculation orifices S0-09-3, S0-09-4 & S0-09-5 in accordance with License Renewal Document PSL-ENG-LRAM-00-114  
CSI-FAC-PSL-2-20P, Summer 2012 Outage Cycle 20 Flow-Accelerated Corrosion (FAC) Outage Inspection Plan for Florida Power & Light Company St. Lucie Unit# 2, Rev. 0  
CSI-FAC-PSL-2-20P, Summer 2012 Outage Cycle 20 Flow-Accelerated Corrosion (FAC) Outage Inspection Plan, Rev. 0  
CSI NDE Procedure NDE 5.2, Ultrasonic Examination of Ferritic Piping Welds, Rev. 18  
CSI NDE Procedure NDE 5.4, Ultrasonic Examination of Austenitic Piping Welds, Rev. 21  
CSI NDE Procedure NDE 6.3, Radiographic Examination General Requirements, Rev. 1  
EC-289070, Pipe Wall Thinning Inspection Program License Renewal Basis Document, Rev. 0  
EC-UCR 287371, UFSAR Change Request Form for PSL-ENG-LRAM-00-114, Pipe Wall Thinning Inspection Program License Renewal Program Basis Document, Rev. 7  
EN-AA-106-1002, Unit-2 Book #2 Pipe Wall Thinning Inspection Program PM01-10-139, Pipe Wall Thinning Inspection Program  
GIR Report 17-017, U2 Aux Feedwater Pump 2A FAC UTT  
GIR Report 17-026, U2 AUX Feedwater Pump 2C UTT Galvanic  
GIR Report U2-2012-AFW-RT-SO-09-3-4-5, Computed Radiography Flow-Accelerated Corrosion Examination Sheet  
PSL-2FSM-03-012, Min Wall Thickness – Lines 2”-BF-39, Rev. 0  
PSL-ENG-LRAM-00-114, Pipe Wall Thinning Inspection Program License Renewal Basis Document, Rev. 7

### UFSAR Section 18.1.4 Small Bore Class 1 Piping Inspection

4th-ISI-PSL-2-Program Plan, St. Lucie Nuclear Power Plant Unit 2 Fourth Inservice Inspection Interval Program Plan, Rev. 1  
AR 022111110, Unit 2 license renewal Class 1 small bore piping program inspection results  
CSI NDE Procedure NDE 5.18, Ultrasonic Thickness Measurement, Rev. 8  
CSI NDE Procedure NDE 5.28, Digital Thickness Measurement, Rev. 1  
EN-AA-106-1002, Unit-2 Book #5 Small Bore Class 1 Piping Inspection  
Letter L-2014-059, Letter from J. Jensen to NRC “License Renewal One-Time Inspection of Class 1 Small Bore Piping Revised Commitments,” March 19, 2014

Letter L-2015-126, Letter from C. Costanzo to NRC, "License Renewal One-Time Inspection of Class 1 Small Bore Piping Revised Commitments and Revised Inspection Plan," May 11, 2015

Letter L-2016-063, Letter from C. Costanzo to NRC "License Renewal One-Time Inspection of Class I Small Bore Piping Inspection Plan Submittal," March 29, 2016

PSL-ENG-LRAM-00-117, Small Bore Class 1 Piping Inspection License Renewal Basis Document, Rev. 6

PSL-ENG-LRAM-16-001, St. Lucie Unit 2 ASME Code Class 1 Small-Bore Piping One Time Inspection Plan, Rev. 0

PSL-ENG-SEOS-01-002, ST. LUCIE PLANT Unit 2 Risk-Infomed ISI Program Development Analysis, Rev. 0

PSL-ENG-SESJ-13-005, Technical Justification for Deviation from EPRI MRP-146 Inspection Schedule for 2 Inch Drain Lines, Rev. 0

UT Data Sheet 5.4-009 Welds CH146 & CH347 SW1-SL2-22

UT Report 5.4-001 Weld RC-141G-SW-8

UT Report 5.4-004 Weld SI-190-FW-907

WO 40446854-01 Weld CH-147-SW5

WO 40446857-01 Weld CH-148 SW18

WO 40448355-01 Weld SI 533-SW27

WO 40448357-01 Weld SI 535-SW-25

#### UFSAR Section 18.1.5 Thermal Aging Embrittlement of CASS Program

Administrative Procedure (ADM)-17.36, Cast Austenitic Stainless Steel (CASS) Aging Management Program, Rev. 1

Calculation 1301079.301, Design Loads for CASS Locations

Calculation 1301079.302, Stress Analysis and Stress Intensity Factors Calculation

Calculation 1301079.303, Crack Growth Evaluation for Surge Line, Safety Injection, and Cold Leg Piping Components

Calculation 1301079.304, Allowable Flaw Size Determination for Safety Injection, Cold Leg Piping, and Surge Line Components

Calculation 1301079.304, Flaw Tolerance Evaluation of St. Lucie Units 1 and 2 CASS Components - Task 2 Report - Saturated Fracture Toughness Determination

Structural Integrity Associates, Inc. Report No. 1301079.402, Development of a CASS Aging Management Program for St. Lucie Units 1 & 2

Work Order 40438830, RCS License Renewal & CASS Weld Examinations

#### UFSAR Section 18.1.6 Containment Cable Inspection Program

2-SMI-64.05A, Nuclear Instrumentation Channel Calibration – Channel A, Rev. 6

2-SMI-64.05B, Nuclear Instrumentation Channel Calibration – Channel B, Rev. 6

2-SMI-64.05C, Nuclear Instrumentation Channel Calibration – Channel C, Rev. 6

2-SMI-64.05D, Nuclear Instrumentation Channel Calibration – Channel D, Rev. 6

PSL-ENG-LRAM-00-063, License Renewal Aging Management Review for Medium and Low Voltage Power Cables and Connections, Rev. 4

PSL-ENG-LRAM-00-064, License Renewal Aging Management Review Low Voltage Instrumentation and Control Cables and Connections, Rev. 4

PSL-ENG-LRAM-02-029, Containment Cable Inspection Program – License Renewal Basis Document, Rev. 6

SPEC-E-022, Containment Cable Inspection Program, St. Lucie Units 1 and 2, Rev. 3

UFSAR Section 18.2.1 Alloy 600 Inspection Program

2008-19236-SA, Alloy 600 Program Self-Assessment

Calculation CN-CI-02-71, Summary of Fatigue Crack Growth Evaluation Associated with Small Diameter Nozzles in CEOG Plants, Rev. 2

EC-UCR 00285687, Alloy 600 UFSAR Change Request

ENG-CSI-A600, Alloy 600 Management Program, Rev. 2

ER-SR-107, Alloy 600 Management Program, Rev. 1

PSL-ENG-LRAM-00-111, Alloy 600 Inspection Program – License Renewal Basis Document, Rev. 5

WCAP-15973-P-A, Low-Alloy Steel Component Corrosion Analysis Supporting Small-Diameter Alloy 600/690 Nozzle Repair/Replacement Programs, Rev. 0

UFSAR Section 18.2.2 ASME Section XI Inservice Inspection Programs

0-GMM-99.17, Threaded Fasteners on Pressure Boundaries, Structural Steel and Plant Equipment, Rev. 8.

2-OSP-68.01, Integrated Leak Rate Test, Rev. 15

2-OSP-68.02, Local Leak Rate Test, Rev. 30

2-OSP-68.03, Airlock Periodic Leak Testing, Rev. 5

51-9189865-000, SL2-20 Refueling Outage August 2012 Reactor Vessel & Internals Remote Visual Examinations

2nd Interval-IWE-PSL-1/2-Program Plan, Second IWE Inspection Interval Program Plan for St. Lucie Nuclear Power Plant Unit 1 and 2, Rev. 1

2nd-Interval-IWE-PSL-2-Schedule, Second 10-Year In-service Inspection Interval IWE Schedule, for St. Lucie Nuclear Power Plant Unit 2, Rev. 1

4th-ISI-PSL-2-Program Plan, Rev. 1

4th-ISI-PSL-2-Schedule, Rev. 2

4th Interval-ISI-PSL-2-Program Plan, St. Lucie Nuclear Power Plant Unit 1 Fourth Inservice Inspection Interval ISI Program Plan for St. Lucie Nuclear Power Plant, Rev. 1

4th-ISI-PSL-2-Schedule, St. Lucie Nuclear Power Plant Unit 2 Fourth Inservice Inspection Interval ISI Schedule for St. Lucie Nuclear Power Plant, Rev. 2

ADM-68.01, Containment Leakage Rate Testing Program, Rev. 24

AP 0005760, Implementation Guidelines of the ASME Section XI Repair and Replacement Program, Rev. 21

AR 02061624

EC 287797, Rev 0, Engineering Evaluation of PSL-ENG-LRAM-00-119, “ASME Section XI, Subsection IWF Inservice Inspection Program –License Renewal Program Basis Document, Rev. 3”

ER-AA-114, Appendix J Testing Program

PSL-ENG-LRM-00-097, ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program – License Renewal Basis Document, Rev. 7

PSL1&2, ISI Program Health Q4-2016, 05/18/2017

QI-10-PR/PSL-4, Plant Inservice Inspection, Rev. 13

QI-10-PR/PSL-8, Control of Repair and Replacements, Rev. 21

QI-10-PR/PSL-5, Technical Specification Surveillance Inspection of Reactor Building, Rev. 19

QI-10-PR/PSL-8, Control of Repairs and Replacements, Rev. 21,

SPEC-M-004, Maintenance Bolting Specification

SPEC-C-007, Erection of Structural and Miscellaneous Steel for Turkey Point Units 3&4 and St. Lucie Units 1 & 2, Rev. 3



UFSAR Section 18.2.4 Chemistry Control Program

0-CMM-14.01, Corrective Maintenance Procedure, Component Cooling Water Pump - Disassembly and Reassembly, Rev. 0  
 0-GMM-99.12B, Water Test Relief Valves with Dunn RV006 Test Bench, Rev. 11  
 0-GMM-99.17, General Maintenance Procedure, Threaded Fasteners on Pressure Boundaries, Structural Steel and Plant Equipment, Rev. 8  
 0-COP-05.01, Chemistry Department QA/QC Program, Rev. 33  
 0-COP-05.04, Chemistry Department Surveillances and Parameters Chemistry, Rev. 98  
 2-OSP-59.01A - "2A-Emergency Diesel Generator Periodic Test and General Operating Instructions," PMID-RQ 35750-24 2A EDG Monthly Surveillance Operations, Rev. 42  
 2-OSP-59.01B - "2B-Emergency Diesel Generator Periodic Test and General Operating Instructions," PMID-RQ 35752-26 2B EDG Monthly Surveillance Operations, Rev. 44  
 AR 01822401, 2B CCW HX Outlet Piping Socket Weld Leak  
 AR 01847867, 2013 Chemistry Training Review Committee Actions  
 AR 01897373, 2013 Condition Evaluation  
 AR 01897377, 2013 INPO Performance Deficiency - CY - Trending  
 CY-AA-100, Conduct of Chemistry, Rev. 3  
 CY-SL-100-0001, Chemistry Department Quality Manual, Rev. 9  
 CY-SL-100-0013, Diesel Fuel Oil Program, Rev. 0 and 1  
 CY-SL-100-0007, Chemistry M&TE Program, Rev. 1  
 CY-SL-102-0204, Determination of Color and Appearance in Diesel Fuel Oil, Rev. 1  
 CY-SL-102-0205, Determination of Particulate Contamination in Diesel Fuel Oil, Rev. 5  
 CY-SL-104-0017, Cooling Water System Inspection and Sampling, Rev. 2  
 CY-SL-107-0001, Receiving, Processing and Periodic Sampling of Diesel Fuel Oil, Rev. 9  
 EPRI 1016555, PWR Secondary Water Chemistry Guidelines, Rev. 7  
 EPRI 3002000505, Pressurized Water Reactor Primary Water Chemistry Guidelines: Volume 1, Rev. 7  
 EPRI 3002000505, Pressurized Water Reactor Primary Water Chemistry Guidelines: Volume 2, Rev. 7  
 EPRI 3002000590, Closed Cooling Water Chemistry Guideline, Rev. 2  
 Focused Self-Assessment (FSA) # 2080679, Closed Cooling Water Chemistry Program Self-Assessment  
 PI-AA-104-1000, Corrective Action Performance Improvement  
 Primary Strategic Water Chemistry Plan, Rev. 11  
 PSL-ENG-LRAM-00-093, Chemistry Control Program – License Renewal Basis Document, Rev. 5  
 Q1-2017 Program Health Report  
 Q4-2016, Program Health Report  
 Quick Hit Assessment Report #1847733-01 (AR1847733-01) Chemical Control Program Self-Evaluation and Trending Analysis Report for 3rd Quarter 2013  
 SSWCP, Strategic Secondary Water Chemistry Plan, Rev. 16

UFSAR Section 18.2.5 Environmental Qualification Program

0-PME-80.07, Preventive Maintenance of Environmentally Qualified Limitorque Motor Operated Valve Actuators, Rev. 11  
 0-PMI-99.03, Instrument and Control Department EQ Maintenance Tabs, Rev. 13  
 2853377, UFSAR Change Request for AR 02092209, original  
 2-PMI-99.01, Instrument and Control Department EQ Maintenance Instructions, Rev. 5  
 ER-AA-112, Environmental Qualification Program, Rev. 1

L-2016-085, Letter from Christopher R. Costanzo to U.S. Nuclear Regulatory Commission, "Re: St. Lucie Unit 2, Docket No. 50-389, Updated Final Safety Analysis Report Amendment No. 23," dated April 19, 2016

NP-704, Environmental Qualification of Electrical Equipment, Rev. 1a

PSL-ENG-LRAM-00-099, EQ Program – License Renewal Basis Document, Rev. 6

PSL-ENG-LRTA-00-051, Engineering Evaluation for Time-Limited Aging Analyses and TLAA Exemptions, Rev. 1

QI-2-PSL-6, Environmental Qualification of Electrical Equipment, Rev. 7

#### UFSAR Section 18.2.6 Fatigue Monitoring Program

ADM-17.43, "Component Cycles and Transients", Rev. 0

AP 0010134, 2016 Annual Report of Cumulative Component Cycles and Transients, 3/31/17

AR 00412987, Revise "Component Cycles and Transients" to include an administrative limit of 80% of the design limit

PSL-ENG-LRAM-00-098, "Fatigue Monitoring Program – License Renewal Basis Document", Rev. 4

#### UFSAR Section 18.2.7 Fire Protection Program

0-OSP-15.12, Wet Pipe Sprinklers System Surveillance, Rev. 3

0-FME-15.01, Deluge and Sprinkler System Testing, Rev. 15

0010239, Fire Protection System Impairment, Rev. 19

EC-UCR 285644, Fire Protection USFAR Change Request

NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water Based Fire Protection Systems, 1998 Edition

PM 00083418, Replace FR Sprinkler Heads

PM 00083419, Replace REG Sprinkler Heads

PM 00083420, Replace Sprinkler Heads

PSL-ENG-LRAM-00-094, Fire Protection Program License Renewal Basis Document, Rev. 9

#### UFSAR Section 18.2.8 Flow Accelerated Corrosion Program

AR 02092710, Assessment of external corrosion through the Flow Accelerated Corrosion Program

AR 02089999, Description of program enhancement in FAC Program implementing procedures

ENG-CSI-FAC-100, Florida Power & Light Company Corporate Long-Term Flow-Accelerated Corrosion Monitoring Program, Rev. 16

ER-AA-111, Flow-Accelerated Corrosion (FAC) Program, Rev. 1

PSL-ENG-LRAM-00-091, Flow Accelerated Corrosion Program – License Renewal Basis Document, Rev. 5

WO 35019456, ST-2 Replaced with Chrome-Moly

WO 35019454, ST-3 Replaced with Chrome-Moly

#### UFSAR Section 18.2.9 Intake Cooling Water Inspection Program

0-CMM-21.04, ICW Strainer Removal, Maintenance and Installation

0-CMM-21.06, Intake Cooling Water (ICW) System Piping Inspection and Repair

0-PMM-14.01, Component Cooling Water Heat Exchanger Clean/Repair

2-OSP-100.27, Schedule of Periodic Tests, Checks and Calibrations" (Unit 2)

2-NOP-21.03A (B), 2A (B) Intake Cooling Water System

2-OSP-21.03, Shiftly Intake Cooling Water Operability Test" (Unit 2)

2-AOP-21.04A (B), 2A (B) Intake Cooling Water System Debris Filter

Evaluation #PSL-ENG-LRAM-00-115, Intake Cooling Water System Inspection Program - License Renewal Basis Document, Rev. 5

PM 00036368-03, FYP1081 ICW PIPING INSP A/C TRN (Unit 2)  
 PM 00036368-04, FYP1081 ICW PIPING INSP (B TRAIN) (Unit 2)  
 PM 00030703-03, PM 00030704-03, PM 00035318-01, PM 00035322-01, Clean, Inspect &  
 Repair CCW Heat Exchangers  
 PM 00038910-02, Overhaul: 2A CCW HT EX Strainer  
 PM 00038912-02, Overhaul: 2B CCW HT EX Strainer  
 SPEC-M-023, Maintenance Specification, ICW System Inspection and Repair for St. Lucie Units  
 1 and 2  
 SPEC-M-081, CCW Heat Exchangers Tube Integrity Inspection Turkey Point Units 3 and 4 and  
 St. Lucie Units 1 and 2

UFSAR Section 18.2.11 Reactor Vessel Integrity Program

0010127, Reactor Engineering Schedule of Periodic Tests and Reports, Rev. 51  
 0010141, Operations Support Engineering Schedule for Technical Specification Surveillance  
 Requirements, Rev. 46  
 EC-UCR 0286880, Completion of Commitment #15, Rev. 0  
 ER-AA-110, Reactor Vessel Integrity Program, Rev. 4  
 PSL-ENG-LRAM-00-120, Reactor Vessel Integrity Program – License Renewal Basis  
 Document, Rev. 5  
 REG-013, Core Monitoring and Trending, Rev. 5

UFSAR Section 18.2.12 Steam Generator Integrity Program

0-COP-05.04, Chemistry Department Surveillances and Parameters, Rev. 97  
 AR1862725, Quick Hit Self-Assessment of the SG Program, 9/17/13  
 EC-UCR 286070, Consistent with GALL Rev. 2, Rev. 0  
 ENG-CSI 2.3, Steam Generator Integrity Program Administration, Rev. 34  
 ER-AP-121, Steam Generator Integrity, Rev. 4  
 PSL-ENG-LRAM-00-092, Steam Generator Integrity Program – License Renewal Basis  
 Document, Rev. 6

UFSAR Section 18.2.13 Systems and Structures Monitoring Program

ADM-17.28, External Corrosion (XCI) Program for Insulated Piping – Inspection Implementation,  
 Rev. 3  
 ADM-17.32, Structures Monitoring Program, Rev. 5  
 ADM-17.33, License Renewal Systems/Programs Monitoring, Rev. 7  
 ENG-CSI-XCI-100, External Corrosion (XCI) Monitoring Program for Insulated Piping for PSL  
 and PTN License Renewal, Rev. 1  
 ER-AA-100-2002, Maintenance Rule Program Administration, Rev. 5  
 MWO 40384372, U2 License Renewal SSMP XCI Inspections – Outage, dated 8/11/2016  
 MWO 40440918, U2 License Renewal System Walkdown Inspection – Outage, dated 8/11/2016  
 MWO 40449103, U2 License Renewal Structural Walkdown – Online, dated 8/11/2016  
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 1/14/2017  
 MWO 40508307, U2 License Renewal System Walkdown/Leak Monitoring – Outage, dated  
 1/14/2017  
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 Basis Document, Rev. 10  
 U2-CC-001, Structural Deficiency Report – Initial Discovery, dated 6/22/2016

UFSAR Section 18.3.2 Metal Fatigue

PSL-ENG-LRTA-00-051, "Engineering Evaluation for Time-Limited Aging Analyses and TLAA Exemptions", Rev. 1

UFSAR 18.3.2.3 Environmentally Assisted Fatigue of Pressurizer Surge Line:

EC287033, Calculation Change: PSL-ENG-LRAM-15-001, PZR Surge Line Inspection Program (Fatigue) – License Renewal Basis Document, Rev. 1

PSL-ENG-LRAM-00-097, ASME Section XI, Subsections IWB, IWC and IWD Inservice Inspection Program – License Renewal Basis Document, Rev. 7

PSL-ENG-LRAM-15-001, PZR Surge Line Inspection Program (Fatigue) – License Renewal Basis Document, Rev. 2

St. Lucie Nuclear Power Plant Unit 2 Fourth Inservice Inspection Interval Program Plan for St. Lucie Nuclear Power Plant, Rev. 2

UFSAR Section 18.3.4 Containment Penetration Fatigue

PSL-ENG-LRAM-01-026, Engineering Evaluation of Environmental Effects of Fatigue, Rev. 3

PSL-ENG-LRTA-00-051, Engineering Evaluation for Time-Limited Aging Analyses and TLAA Exemptions, Rev. 1

St. Lucie Nuclear Power Plant Unit 2 Fourth Inservice Inspection Interval Program Plan for St. Lucie Nuclear Power Plant, Rev. 2

UFSAR 18.3.6 Crane Load Cycle Limit:

EC249912, Calculation Change: Crane Fatigue Time-Limited Aging Analysis (TLAA) – for License Renewal, dated 10/13/2010

PSL-BFSC-01-014, Crane Fatigue Time-Limited Aging Analyses (TLAA) – for License Renewal, Rev. 0

PSL-ENG-LRTA-00-051, Engineering Evaluation for Time-Limited Aging Analyses and TLAA Exemptions, Rev. 1

Newly Identified Structures, Systems, and Components

PSL-ENG-5437-17-002, 10 CFR 54.37(b), Rev. 0

EC282743, Transition to 10 CFR 50.48(C) – NFPA 805, Rev. 0

**LIST OF ACRONYMS**

AFW	Auxiliary Feedwater
AMP	Aging Management Program
AR	Action Request
ASME	American Society of Mechanical Engineers
BACC	Boric Acid Corrosion Control
BPVC	Boiler and Pressure Vessel Code
CAP	Corrective Action Program
CASS	Cast Austenitic Stainless Steel
CCW	Component Cooling Water
CST	Condensate Storage Tank
EPU	Extended Power Update
EQ	Environmental Qualification
FAC	Flow Accelerated Corrosion
GALL	Generic Aging Lessons Learned
HS	Heat Sink
ICW	Intake Cooling Water
ISI	Inservice Inspection
LRA	License Renewal Application
NDE	Non-destructive Examination
NFPA	National Fire Protection Association
PEO	Period of Extended Operation
PMID-RQs	Preventive Maintenance Requirements
RVI	Reactor Vessel Internals
SER	Safety Evaluation Report
SFP	Spent Fuel Pool
SSCs	Systems, Structures, or Components
TLAAs	Time-limited Aging Analysis
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WOs	Work Orders