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L-2017-071  
10 CFR 50.59(d)

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

Re: St. Lucie Unit 1  
Docket No. 50-335  
Report of 10 CFR 50.59 Plant Changes

Pursuant to 10 CFR 50.59(d)(2), the attached report contains a brief description of any changes, tests and experiments, including a summary evaluation of each, which were made on Unit 1 during the period of Amendment No. 28 (April 25, 2015 through November 9, 2016) dated May 2017 and minor update 27A dated January 2016. This submittal correlates with the information included in Amendment 28 of the Updated Final Safety Analysis Report to be submitted under separate cover.

Please contact us if there any questions on this information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael J. Snyder', is written over a faint, larger version of the same signature.

Michael J. Snyder  
Licensing Manager  
St. Lucie Plant

MJS/lrb

Enclosure

cc: USNRC Regional Administrator, Region II  
USNRC Project Manager, St. Lucie Plant  
USNRC Senior Resident Inspector, St. Lucie Plant

IE47  
NRR

ST. LUCIE UNIT 1  
DOCKET NUMBER 50-335  
CHANGES, TESTS AND EXPERIMENTS  
MADE AS ALLOWED BY 10 CFR 50.59  
FOR THE PERIOD OF  
APRIL 25, 2015 THROUGH NOVEMBER 9, 2016  
AND  
MINOR UPDATE 27A DATED JANUARY 2016  
(15 PAGES INCLUDING COVER)

## INTRODUCTION

This report is submitted in accordance with 10 CFR 50.59 (d)(2), which requires that:

- i) changes in the facility as described in the SAR;
- ii) changes in procedures as described in the SAR; and
- iii) tests and experiments not described in the SAR

that are conducted without prior Commission approval be reported to the Commission in accordance with 10 CFR 50.90 and 50.4. This report is intended to meet these requirements for the period of April 25, 2015 through November 9, 2016.

This report is typically divided into three (3) sections.

First, changes to the facility as described in the Updated Final Safety Analysis Report (UFSAR) performed by a Permanent Modification are addressed.

Second, changes to the facility/procedures as described in the UFSAR, or tests/experiments not described in the UFSAR, which are not performed by a Permanent Modification, are addressed.

Third, a summary of any Fuel Reload 10 CFR 50.59 evaluation is addressed.

Sections 1, 2 and 3 summarize specific 10 CFR 50.59 evaluations that evaluated the specific change(s). Each of these 10 CFR 50.59 evaluations concluded that the change does not require a change to the plant technical specifications, and prior NRC approval is not required.

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**SECTION 1**

**PLANT CHANGE / MODIFICATIONS**

EC 283007, R2

Permanent Removal of St. Lucie Unit 1 RCP 1B2 Whip (Cable)  
Restraints

SUMMARY

To allow for future maintenance of the reactor coolant pump, the upper RCP cable (whip) restraints were permanently removed.

Regulatory Background

The St. Lucie Unit 1 Construction Permit was issued on July 1, 1970 and an Operating Licensing was licensed in March 1976. Prior to 1986, General Design Criterion (GDC) 4, "Environmental and Missile Design Bases," required that systems and components important to safety be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharge fluids, which may result in equipment failures. In accordance with NRC Branch Technical Position ASB 3-1, plants for which construction permits were tendered before July 1, 1993, and operating licenses were issued after July 1, 1975, should follow the guidance of Appendix B of ASB 3-1 (letter by A Giambusso, December 1972, General Information Required for Consideration of the Effects of a Piping System Break Outside Containment") and also provide moderate energy piping failure analyses in accordance with Branch Technical Position ASB 3-1. Accordingly, the original St. Lucie Unit 1 design bases considered all dynamic effects (missile generation, pipe whipping, pipe break reaction forces, jet impingement forces, compartment, sub-compartment and cavity pressurizations and decompression waves with the ruptured pipe) and all environmental effects (pressure, temperature, humidity, and flooding) resulting from arbitrary intermediate pipe ruptures.

Circa ~ 1986, GDC 4 was revised to read:

"Environmental and dynamic effects design bases". Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accident. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping."

Consistent with the revision to GDC 4, on June 19, 1987, the NRC issued Generic Letter 87-11, Relaxation in Arbitrary Intermediate Pipe Rupture Requirements which finalized a revision to Branch Technical Position (BTP) MEB 3-1 of Standard Review Plan (SRP) Section 3.6.2 in NUREG-0800. The revisions to BTP MEB 3-1 and SRP 3.6.2 eliminated all dynamic effects and all environmental effects resulting from arbitrary intermediate pipe ruptures. This action allows the elimination of pipe whip restraints and jet impingement shields placed to mitigate the effects of arbitrary intermediate pipe ruptures, and other related changes.

On October 30, 1990, the NRC accepted Topical Report CEN-367, "Leak-Before-Break Evaluation of Primary Loop Piping in Combustion Engineering Designed Nuclear Steam Supply Systems, which was submitted for staff review by Combustion Engineering Owners Group (CEOG) letter dated November 20, 1987. FPL was a participating CEOG member and St. Lucie Units 1 and 2 were included in the bounding analyses submitted.

By letter to the NRC dated August 26, 1992, FPL proposed to eliminate the dynamic effects associated with high energy pipe rupture in the reactor coolant system piping from the licensing and design bases of St. Lucie Units 1 and 2 by the application of leak-before-break (LBB) technology. This change to the licensing and design bases is permitted by revised GDC-4 of Appendix A to 10 CFR 50.

By NRC letter dated March 5, 1993, the staff concluded that since the St. Lucie Units are bounded by the CEOG analyses and the leakage detection systems are capable of detecting the specified leakage rate, the dynamic effects associated with postulated pipe breaks in the primary coolant system piping can be excluded from the licensing and design bases of the St. Lucie Units. Furthermore by NRC letter dated July 9, 2012, NRC staff concludes that Leak Before Break remains valid for SL-1 under EPU conditions.

The Unit 1 UFSAR was updated to incorporate the effects of the staff's approval. Section 3.1.4 was revised to read:

Due to the application of leak before break methodology to the RCS hot and cold leg piping, the dynamic effects of a loss of coolant accident do not have to be considered. A technical evaluation was performed to demonstrate that the probability or likelihood of large pipe breaks occurring in the primary coolant loops is sufficiently low that they need not be a design basis (see Reference 24 in Section 3.6)

UFSAR Section 3.6.2 was revised to include the following acceptance criteria:

It should be noted that circumferential (guillotine) and longitudinal (slot) breaks in RCS hot and cold leg piping are no longer considered a design basis for GDC 4 (Reference 27 NRC acceptance letter for leak-before-break). The primary loop piping is not susceptible to failure from the effects of corrosion, water hammer, fatigue, brittle fracture or indirect causes such as missiles or failure of nearby components. As a result, the mechanical/structural loadings associated with the dynamic effects of a large hot or cold leg break need not be considered.

The proposed permanent removal of the upper two 3.5-inch reactor coolant pump RCP 1B2 whip (cable) restraints meets the acceptance criteria found in Generic Letter 87-11. Also as documented in NRC letter dated March 5, 1993, the NRC staff has concluded that since the St. Lucie Units are bounded by the CEOG analyses and the leakage detection systems are capable of detecting the specified leakage rate, the dynamic effects associated with postulated pipe breaks in the primary coolant system piping can be excluded from the licensing and design bases of the St. Lucie Units. The EPU leak-before-break evaluation is based on evaluation CEN-367-A. The primary loop piping normal operating, SSE and pressure loads due to the EPU conditions were used in the EPU evaluation. The results of the evaluation demonstrated that leak-before-break recommended margins for the primary loop piping continue to be satisfied for the EPU conditions. Calculation CN-MRCDA-09-68 provides an analysis of the RCP and surrounding components to demonstrate the RCP HELB cable restraints for pumps 1A1, 1A2, 1B1 and 1B2 can be permanently removed. In addition, calculation CN-MRCDA-09-06 documents that sufficient leak-before-break margin on crack stability is maintained on the main coolant loop hot and cold leg pipes under EPU conditions. NRC letter dated July 9, 2012, concludes that Leak Before Break remains valid for SL-1 under EPU conditions. The permanent removal of the upper RCP 1B2 whip restraints meets the acceptance criteria of BTP 3-1, as contained in SRP Section 3.6.2, in that absent the whip restraints the primary coolant system piping continues to meet the applicable ASME Code design requirements.

#### Evaluation

There are no Technical Specifications that address the restraints. However, as discussed in the Safety Evaluation by the NRC on Leak-Before-Break (LBB) Technology, the acceptance of LBB is based on a leakage detection system consistent with Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems." Technical Specification Section 3/4.4.6.1 addresses the RCS leakage detection

system and no changes to this section or any other section is required as a result of the removal of the cable restraints.

A License Amendment Request is not required. The RCS whip restraints were installed during initial construction of St. Lucie Unit 1 to mitigate the dynamic effects associated with postulated RCS hot and cold leg piping breaks. In 1993 the dynamic effects associated with postulated pipe ruptures in RCS hot and cold leg piping were excluded from the design and licensing bases of St. Lucie Unit 1, as described in UFSAR Section 3.6. In 2012, it was concluded that the leak before break analysis remains valid for EPU conditions. Because the proposed change does not require a change to the technical specifications and does not meet any of the criteria in 10 CFR 50.59(c)(2), the change can be made without obtaining a license amendment pursuant to 10 CFR 50.90.



**SECTION 2**

**50.59 EVALUATIONS**

EC 284358, R1  
Increased Steam Generator Blowdown  
Flow Rate (Unit 1)

SUMMARY

The EC 284358 associated with this 50.59 Evaluation was prepared to increase the current steam generator blowdown (SGBD) system flow rate values in the accident analysis from 50 gpm or 65 gpm per SG to a maximum value of 120 gpm per SG, and make the necessary UFSAR changes as a result. The analyses also assumed new times for SGBD manual isolation in the events at 25 minutes, instead of current timing documented in the UFSAR for the Station Blackout and Chapter 10 Loss of Feedwater event. The SG low level RPS trip setpoints have also been changed in the analyses to remove some existing conservatism. There are no physical changes to plant systems or components from this EC, and documentation changes are necessary to address concerns first identified in ARs 02030177 and 02031217. The activity has been considered to be adverse per 50.59 screening, since it affects the maximum SGBD flow rate assumed in the accident analyses for the loss of feedwater (LOF) events (Chapter 10 and 15), feedwater line break (FLB) event, and Station Blackout (SBO) event, and operator action time requirements have been changed. Reanalysis calculations for these events used as input in this evaluation were provided to FPL via AREVA letter FAB15-00438, "St. Lucie-1 Evaluation of Increased Steam Generator Blowdown Flow", dated 07-16-2015. This evaluation is applicable to the UFSAR changes (EC Attachment #5), applicable to procedure changes (as described in Section 2.3 of the EC and any other related), and Operator Action Times evaluation PSL-ENG-SEMS-12-006 changes.

Because the proposed change does not require a change to the technical specifications and does not meet any of the criteria in 10 CFR 50.59(c)(2), the change can be made without obtaining a license amendment pursuant to 10 CFR 50.90.

EC 284437, R1  
Evaluation of Actions Required to Mitigate  
Hot Leg Injection Single Failure Vulnerability

SUMMARY

The St. Lucie Unit 1 FSAR was recently updated to include a description of measures required for the mitigation of Hot Leg Injection single failure vulnerability. In conjunction with this update, 1-EOP-99 was revised and new procedures 1-GME-100.03 and 1-GME-100.03A were issued. These changes were all "screened out" under a 10 CFR 50.59 screening. In July 2015, AR 2063184 was initiated to document the following:

"The NRC senior resident inspector commented on the 50.59 screenings associated with the procedures and UFSAR changes that were made to formalize the use of jumpers for certain Unit 1 alternate Hot Leg Injection failure scenarios. NEI guidance for 50.59s typically expects that evaluations for the use of manual actions in lieu of automatic actions would 'screen in' with respect to performing a full 50.59 evaluation." Engineering Evaluation PSL-ENG-SENS-15-001, under EC 284437, evaluates the FSAR change, issues a new UFSAR change request (UCR), and evaluates the changes that were made to the procedures. This Evaluation applies to the new UCR, and to the previous UFSAR change and the procedures changes, retroactively.

Because the proposed change does not require a change to the technical specifications and does not meet any of the criteria in 10 CFR 50.59(c)(2), the change can be made without obtaining a license amendment pursuant to 10 CFR 50.90.

EC 287794, R2  
Connection of Temporary Air Compressors to  
Support Unit 1 Instrument Air Compressor Replacement

SUMMARY

EC 287794 provides Temporary Air Compressors and Dryers (TAC/Ds) to supply compressed air to the Instrument Air System (IAS) while the existing air compressors and dryers are being replaced under EC# 283796.

EC 283796 replaces the existing Instrument Air Compressors (IA COMPR 1A, IA COMPR 1B, IA COMPR 1C, IA COMPR 1D), Air Dryers (IA DYR 1A and IA DYR 1B) and associated equipment. The sequence of activities requires disconnecting and removing all of the existing compressors before the new compressors and equipment can be installed.

From the time the existing compressors are disconnected until the new compressors and equipment are turned over to operations, instrument air will be supplied by three, redundant, > 200% capacity, temporary compressors and dryers via temporary rubber hoses.

One electrically driven compressor, two diesel driven compressors, and three dryers will be installed. Each compressor and dryer is capable of supplying air at > 200% of the existing 100% air compressors. If the electrically driven compressor trips off line, one of the two redundant diesel driven compressors will start automatically to supply compressed air to the IAS. If that diesel driven compressor fails to supply the required air, the other diesel driven compressor will automatically start. Both diesel driven compressors have a nominal 8-hour fuel supply.

Temporary rubber air hoses will be run to complete the connection from the temporary air dryers to the instrument air system. The Unit 1 to Unit 2 cross tie is unchanged. The TAC/Ds have enough capacity to supply the instrument air needs for both Units if necessary. Thus cross tie capabilities are unaffected.

Instrument air controls and setpoints are unchanged. All compressors are controlled locally.

The TAC/Ds must provide air of the same quality, and as reliably as the permanent compressors and dryers to avoid placing the plant in an unstable condition, and/or requiring a reactor scram per procedure 1-AOP-18.01, Step 4.1.1.

Per Procedure EN-AA-203-1201, Section 4.5.8, a change is to be considered adverse if it decreases the reliability of the design function, or reduces the existing redundancy, diversity, or defense in depth.

It is conservatively assumed that the use temporary rubber hose connections are not as reliable as permanently installed equipment and this is evaluated here-in.

The use of a temporary air supply compressors for the IAS does not affect and is not affected by the Technical Specifications. Using temporary compressors and dryers to provide air to the IAS has a less than minimal effect on the IAS reliability, and no effect on the consequences of a loss of instrument air. Because the proposed change does not require a change to the technical specifications and does not meet any of the criteria in 10 CFR 50.59(c)(2), the change can be made without obtaining a license amendment pursuant to 10 CFR 50.90.

**SECTION 3**

**CORE RELOAD EVALUATION**

EC 285570, R2  
St. Lucie Unit 1 Cycle 27 Core Reload

SUMMARY

St. Lucie Unit 1 Cycle 27 Core Reload did not require a 10 CFR 50.59 Evaluation. The discussions within this EC, along with the 10 CFR 50.59 Applicability/Screening which were performed, justify that the design and operation of the Cycle 27 reload core does not meet any of the criteria in 10 CFR 50.59(c)(2). The core reload activities can be implemented with no changes to the St. Lucie Unit 1 Technical Specifications. The safety analyses results are within the current design basis, within the acceptance limits provided by the NRC regulatory criteria and within the criteria provided by 10 CFR 50.59. Therefore, prior NRC approval is not required for implementation of this EC.