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OCT 0 4 2018

L-2018-171
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 of the evaluation of each, which were made on Unit 1 during the period of November 09, 2016 through April 13, 2018. This submittal correlates with the information included in Amendment 29 of the Updated Final Safety Analysis Report to be submitted under separate cover.

Should you have any questions regarding this submittal, please contact Mr. Michael J. Snyder, Licensing Manager, at 772-467-7036.

Sincerely,

Michael J. Snyder
Licensing Manager
St. Lucie Plant

MJS/rcs

Enclosure

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

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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
NOVEMBER 09, 2016 THROUGH APRIL 13, 2018

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 November 09, 2016 through April 13, 2018.

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

1. Summaries of changes to the facility as described in the Updated Final Safety Analysis Report (UFSAR) performed by a permanent modification are summarized.
2. Summaries of changes to the facility or procedures as described in the UFSAR, and for tests and experiments not described in the UFSAR, which are not performed by a permanent modification.
3. A summary of any fuel reload 10 CFR 50.59 evaluation.

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

PERMANENT MODIFICATIONS

NONE

For the time period of this report, there were no changes to the facility as described in the UFSAR performed by a permanent modification.

SECTION 2

50.59 EVALUATIONS

EC 288300, REVISION 0

CORRECTION TO STEAM GENERATOR LEVEL MODELING ERROR

SUMMARY

EC 288300 corrected a modeling error in the steam generator (SG) level calculation for some non-LOCA accident analyses. This error may have resulted in an over prediction of SG mass, and the effect upon the SG indicated level calculation could have been an earlier than expected reactor protection system (RPS) and auxiliary feedwater actuation system (AFAS) actuations on SG low level.

The only accidents affected in this activity which were reanalyzed are; the Loss of Normal Feedwater flow (LNFF, UFSAR Chapters 10 and 15), Station Blackout (SBO) and Steam Generator Tube Rupture (SGTR). The UFSAR is being revised for Sections 10.5 (Loss of Feedwater with degraded or no AFW flow), 15.2.8 (Loss of Normal Feedwater) and 15.2.13 (Station Blackout) to reflect the new analysis of record for these events. A 50.59 evaluation is required since the RPS and AFAS actuations are delayed in the reanalysis compared to the previous analysis of record (AOR). No UFSAR change was required for the SGTR event.

The changes with respect to these reanalyzed accidents do not introduce the possibility of a change in the frequency of an accident occurrence because those changes in the safety analyses are not new accident initiators and no new failure modes are introduced. There is no increase in the frequency of occurrence of these previously evaluated accidents in the UFSAR due to reanalysis of these events.

The impact of the changes was analyzed, and all safety analyses acceptance criteria are still met. Additionally, no SSC is being modified or changed; therefore, there is no increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

Only the SGTR event is analyzed for the radiological consequences and the original inputs to the SGTR radiological calculations have been evaluated to remain unaffected. Therefore, there is no increase in the radiological consequences of an accident previously evaluated in the UFSAR. Also, no SSC is being modified or changed, which would result in a malfunction to affect radiological consequences. Therefore, there is no increase in the radiological consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

The proposed activity would not create the possibility of an accident of a different type than any previously evaluated in the UFSAR, nor create the possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in UFSAR, since the activity involves only revising the inputs in the analyses, and no SSC is being modified or changed.

The fission barriers (cladding, RCS and containment) remain intact and unchallenged by the activities in this EC. No SSC is being modified or changed. The reanalysis shows that all the acceptance criteria for each event (i.e., maintain subcooling margin to remove decay heat and avoid pressurizer overfill for a LNFF event; avoid steam generator overfill for SGTR; maintain collapsed liquid level in the Reactor Vessel above the top of the hot leg nozzles during the 4 hour event, maintain steady natural circulation flow during the 4 hour period, and maintain adequate RCS inventory to ensure sufficient core cooling, and that the core does not uncover for the SBO event) for the fission product barriers have been met. Therefore, the analysis changes in this EC do not result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered.

There are no changes to the method of evaluation in the reanalysis performed in this EC. The reanalysis of each event was performed using the same NRC approved methodology described in the UFSAR for the respective analyses. Therefore, this reanalysis does not result in a departure from a method of evaluation described in the UFSAR

This does not impact the Technical Specifications. Based upon the evaluation under 10 CFR 50.59, a 10 CFR 50.90 license amendment request is not required.

EC 289683, Revision 0

HOT LEG INJECTION IMPLEMENTATION DOCUMENTATION

SUMMARY

EC 289683 updates St. Lucie Unit 1 documentation for implementing simultaneous hot and cold leg injection to achieve long-term cooling following a large break loss of coolant accident (LBLOCA). Under the current licensing basis, hot leg injection is achieved via one of a number of potential paths which are individually not single failure proof, but which complement each other and, collectively provide a single failure proof ECCS design.

The activity covered by this evaluation involves manual actions to install temporary power jumpers to support the hot leg injection design function that is credited in the safety analyses.

The proposed activities are performed post-accident to mitigate single failure vulnerabilities in the hot leg injection flow paths. Since these activities are post-accident, the activities have no contribution to the probability of occurrence of any accident; thus, they do not result in any increase in the frequency of occurrence of any accident previously evaluated in the UFSAR.

As part of its original application for an Operating License, St. Lucie identified to the NRC that HLI flow paths were vulnerable to single-failure, and the NRC accepted this vulnerability. The single-failure vulnerability of HLI flow paths was subsequently modeled in the St. Lucie Unit 1 Probabilistic Risk Assessment (PRA). When the actions to mitigate the single-failures were proceduralized, the PRA model was modified to include the mitigation actions. A comparison of the PRA results was made, and concluded that the proceduralized single-failure mitigation actions results in a decrease in Core Damage Frequency.

The installation of the cross-tie jumpers preserves electrical separation and results in negligible impact on core damage frequency. The analysis assumes one train of electric power is lost. For this post-LBLOCA action, the jumpers are connected to the valves after they are already disabled on the de-energized train. Therefore, there is no increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

The actions are taken to mitigate vulnerability to single failure, and allow HLI to be performed under the worst-case scenario of LOOP-LOCA with the active failure of a power train. These actions allow the mitigation of the accident to continue in accordance with the safety analyses. Thus, qualitatively, there is no increase in radiological consequences, because there is no change to the accident as analyzed.

Jumper installation can be accomplished while remaining within the allowable mission dose based upon the mission timing and use of SCBA. Therefore, the activity does not result in more than a minimal increase in the radiological consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

The actions taken to mitigate single failure vulnerability of HLI are taken after a design basis accident, and are only required under the worst-case scenario of an active power supply failure coincident with LOOP–LOCA. The actions are performed under procedural guidance using pre-manufactured and pre-staged jumpers specially designed for their function. As discussed above, the actions do not result in an increase in the likelihood of occurrence of a malfunction of an SSC, and do not result in a possibility of malfunction of a SSC with a different result. Given that the likelihood of failure is not increased, the result of failures is unchanged, and no new failures are introduced, the introduction of the possibility of an accident of a different type is not credible.

A Failure Modes and Effects Analysis (FMEA) was performed for the HLI design using five diverse flow paths. The FMEA evaluated specific single component failures and the combined effects of electrical bus failures for each of the five flow paths. The FMEA concluded that a single electrical failure (e.g., loss of an EDG or DC Bus) can disable all HLI flow paths, requiring operator action to mitigate the single failure. The FMEA also concluded that no single mechanical failure will result in loss of all diverse HLI flow paths.

As discussed above, the event initiator (i.e. single failure of the loss of an electrical train concurrent with a LBLOCA), which resulted in the need for the HLI jumpers to repower selected MOVs to provide an HLI flow path, also establishes that the "de-energized" electrical train is "lost", and is no longer credited to perform any safety-related functions. Therefore, as the "lost" electrical train cannot be degraded further, there are no longer any train separation requirements which would apply, as only a single train is available. The remaining operable (energized) train is protected from any adverse interactions from the "lost" de-energized electrical train. The jumpers are installed for a relatively short time, and removed prior to reconnecting and re-energizing the "primary" train, i.e., prior to restoring the "primary" train to service. Therefore, there is no increased potential for common mode failure. Because electrical separation and isolation criteria are maintained, the installation of the temporary jumpers does not cause the possibility of a malfunction with a different result than the failures previously analyzed.

This activity takes action to mitigate vulnerability to single failure, and allow HLI to be performed under the worst-case scenario of LOOP-LOCA with the active failure of a power train. These actions allow the mitigation of the accident to continue in accordance with the safety analyses. These actions have no impact on fuel cladding, RCS pressure boundary, or containment design parameters; thus, the actions do not have any effect on Design Basis Limits for Fission Product Barriers.

The analyses associated with boron precipitation are described in UFSAR Appendix 6C. The changes evaluated under EC 289683 do not use or introduce new methodologies. Thus, there is no departure from a methodology described in the UFSAR.

Technical Specifications require operability of ECCS systems, but there are no Technical Specifications directly related to HLI or HLI lineups. Therefore, this does not impact the Technical Specifications. Based upon the evaluation under 10 CFR 50.59, a 10 CFR 50.90 license amendment request is not required.

EC 290004, Revision 0

SPENT FUEL POOL IMPROVED OFFLOAD TIMING

SUMMARY

EC 290004 evaluates a reduction in the offload start time that in turn results in an increase to the peak local water temperature calculation in UFSAR Section 9.1.3, which is an adverse direction since a margin to the limit is reduced.

The peak local water temperature is not used to determine the frequency of occurrence of an accident. Therefore, the change (as it remains below the limit) does not result in increase in the frequency of occurrence of an accident as described in the UFSAR. Similarly, the peak local water temperature is not used to determine the likelihood of occurrence of a malfunction of any SSC important to safety. Therefore, the change does not result in a change in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

As long as the value for the peak local temperature remains below the limit, there is no impact to any radiological assessment of any accident evaluated in the UFSAR. Therefore, there is no change in the radiological consequences of an accident previously evaluated in the UFSAR. Similarly, as long as the value for the peak local temperature remains below the limit, there is no impact to any radiological assessment of any malfunction evaluated in the UFSAR. Therefore, there is no change in the radiological consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

Peak local water temperature, which is below the limit, is not an initiator of any accident, so it cannot cause any accident to occur. Therefore, there is no possibility for this change to result in an accident of a different type than previously evaluated in the UFSAR to occur. Similarly, peak local water temperature, which is below the limit, is also not an initiator of any malfunction of any SSC, so it will not create the possibility for a malfunction of any SSC important to safety with a different result than any previously evaluated in the UFSAR.

The peak local water temperature limit is being clarified; however, it is not a design basis limit for a fission product barrier. Therefore, the proposed activity does not exceed or alter a design basis limit for a fission product barrier as described in the UFSAR. This change also uses the same method of evaluation currently described in the UFSAR, so there is no departure from a method of evaluation described in the UFSAR used in establishing the design bases or in the safety analyses.

This does not impact the Technical Specifications. Based upon the evaluation under 10 CFR 50.59, a 10 CFR 50.90 license amendment request is not required.

EC 290535, Revision 0

CORRECTION TO EXTENDED POWER UPRATE ALTERNATIVE SOURCE TERM DOSE CALCULATIONS

SUMMARY

EC 290535 revises and corrects a calculation error for the radiological consequences of the steam generator tube rupture (SGTR) event presented in Section 15.4.4 of the St. Lucie Unit 1 UFSAR for Extended Power Uprate (EPU) conditions using the Alternative Source Term methodology described in USNRC Reg. Guide 1.183. The 10CFR50.59 Screening determined that there is an adverse impact on the SGTR radiological dose analysis currently described in the St. Lucie Unit 1 UFSAR Section 15.4.4.5 and Table 15.4.4-9.

The UFSAR change, regarding the impact on the SGTR concurrent iodine spike dose due to the modeling error, does not introduce the possibility of a change in the frequency of an accident. The calculation error correction and resulting dose, which meet the acceptance criterion, are not an input to determining the frequency of occurrence of an accident. Also, the UFSAR change does not introduce the possibility of a change in the likelihood of a malfunction because the calculation error correction and resulting dose, which meet the acceptance criterion, are not an initiator of any malfunctions and no new failure modes are introduced.

The revised St. Lucie Unit 1 SGTR radiological dose analysis continues to meet the regulatory radiological dose acceptance criterion for control room dose of 5 REM TEDE. The revised analysis shows that the increase in calculated dose is small, and resulted in a calculated increase of 2.2% for overall control room dose, which is < 2% of the margin to the limit. This increase is less than 10% of the margin to the limit of NEI 96-07 Section 4.3.3 and the dose increase is considered no more than minimal. Therefore, this UFSAR change does not result in a more than a minimal increase in the radiological consequences of an accident previously evaluated in the UFSAR.

The UFSAR change does not introduce the possibility of a change in the radiological consequences of a malfunction because the calculation error correction and resulting dose, which meet the acceptance criterion, are not an initiator of any malfunctions, and no new failure modes are introduced.

The UFSAR change does not introduce the possibility of a new accident because the calculation error correction and resulting dose are not an initiator of any accident and no new failure modes are introduced. Also, the UFSAR change does not introduce the possibility for a malfunction of an SSC with a different result because the calculation error correction and resulting dose do not introduce a new failure mode or new malfunction.

The revised St. Lucie Unit 1 SGTR radiological dose analysis continues to meet the acceptance criterion of the control room dose 5 REM TEDE. The UFSAR change does not result in a change that would cause any system parameter to change. Therefore, the proposed UFSAR change does not result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered.

This UFSAR change does not constitute a change in method of evaluation as defined in Section 3.4 of NEI 96-07. The revised analysis continues to use the same methodology as used in previous calculation based on approved methodology. Therefore, the UFSAR change does not result in a departure from a method of evaluation described in the UFSAR used in establishing the design bases or in the safety analyses.

This does not impact the Technical Specifications. Based upon the evaluation under 10 CFR 50.59, a 10 CFR 50.90 license amendment request is not required.

SECTION 3

FUEL RELOAD EVALUATION

EC 289681, Revision 3
ST. LUCIE UNIT 1 CYCLE 28 RELOAD

SUMMARY

The St. Lucie Unit 1 Cycle 28 Core Reload did not require a 10 CFR 50.59 Evaluation. The discussions within this EC, along with the associated 10 CFR 50.59 Applicability Determination and Screening, justify that the design and operation of the Cycle 28 core reload 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.