April 20, 2020

L-2020-044
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 changes, tests and experiments, including a summary of the evaluation of each, which were made on Unit 1 during the period of April 13, 2018 through November 20, 2019. This submittal correlates with the information included in Amendment 30 of the Updated Final Safety Analysis Report to be submitted under separate cover.

Please contact me at 772-467-7435 with any questions regarding this submittal.

Sincerely,

Wyatt Godes
Licensing Manager
St. Lucie Plant

WG/rcs

Enclosure

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

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 13, 2018 THROUGH NOVEMBER 20, 2019

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 13, 2018 through November 20, 2019.

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 for the specific changes. Each of these 10 CFR 50.59 evaluations concluded that the change did not require a change to the plant technical specifications, and prior NRC approval was not required.

TABLE OF CONTENTS

SECTION 1

PERMANENT MODIFICATIONS

EC 289281
WIRELESS INFRASTRUCTURE PROJECT

SUMMARY

St. Lucie presently has a wireless local area network installed and operating at numerous locations around the station consisting mainly of administrative buildings, warehouses and outdoor coverage areas. EC 289281 installs a wireless network communications system located within the Reactor Auxiliary Building (RAB), Turbine Building (TB), Fuel Handling Building (FHB), Diesel Generator Building (DGB), Component Cooling Water (CCW) Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Technical Support Center (TSC).

Creating the new wireless infrastructure involves installation of data racks (consisting of Ethernet switches, power supplies and patch panels), raceway, cables, and wireless access points in various locations. Existing non-safety related power or lighting panels are used to power this equipment.

The expansion of the existing wireless system will increase the level of Electromagnetic interference (EMI) and radio-frequency interference (RFI) in the areas where the data racks and wireless access points are installed. The increase in electrical noise in the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room has the potential to have an adverse impact on the environment and design functions of SSCs installed in these areas. All other aspects of EC 289281 screened out from further 10 CFR 50.59 evaluation. The 10 CFR 50.59 Evaluation applied the guidance of EPRI TR-102348 Revision 1 (NEI 01-01), “Guideline on Licensing Digital Upgrades.”

EC 289281 documents an evaluation of the impact of Electromagnetic and Radio-Frequency Interference generated by the wireless infrastructure backbone components including the location of these components to surrounding components in the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room to demonstrate that there is adequate margin between the emission and equipment susceptibility levels such that the installation will not adversely impact EMI/RFI sensitive equipment installed within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room. This evaluation is based upon the guidance in Appendix I of EPRI TR 102323 Revision 4 and maintains the margins recommended in Regulatory Guide 1.180 Revision 1. EC 289281 justifies selection of the equipment susceptibility levels for non-tested legacy equipment based on guidance provided in EPRI TR 102323 Revision 4. To ensure that the increase in electrical noise in the RAB does not impact SSCs within the Control Room, the wireless access points installed in the TSC are separated from sensitive equipment installed within the Control Room by a distances well in excess of the minimum required separation distance.

The selection of wireless communication devices with sufficiently low emission levels coupled with the placement of these devices sufficiently far from EMI/RFI sensitive equipment is credited in EC 289281 to ensure electromagnetic compatibility with EMI/RFI sensitive equipment. There are no known or anticipated failure modes of the wireless infrastructure backbone components that could result in an increase in the EMI/RFI interference generated by the wireless equipment. The installation and testing plan in EC 289281 includes requirements that prior to energizing the access points, a physical verification be performed to ensure that the access points meet the required separation distance from EMI/RFI sensitive equipment.

As such, the UFSAR described design functions of equipment installed within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room that could be susceptible to Electromagnetic and Radio-Frequency Interference are not adversely impacted by EC 289281.

Therefore, the increase in electrical noise within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room does not result in more than a minimal increase in the frequency or likelihood of occurrence of an accident previously evaluated in the UFSAR.

For the reasons discussed above, it was also concluded that the increase in electrical noise within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room does not result in more than a minimal increase in the radiological consequences of a malfunction of an SSC important to safety or an accident previously evaluated in the UFSAR.

The evaluated lack of adverse impact also leads to the conclusion that the increase in electrical noise within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room does not create a possibility for a malfunction of an SSC important to safety with a different result or an accident of a different type than any previously evaluated in UFSAR.

There are no numerical values in the UFSAR that are used directly in the determination of the integrity of the fission product barriers that are associated with the change in the electrical noise level in the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room environment. Therefore, the increase in electrical noise within the RAB, TB, FHB, DGB, CCW Heat Exchanger and Pump Area, Intake Structure, Switchyard, and Control Room does not result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered.

There are no methods of evaluation described in the UFSAR impacted by the change.

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 291158
ROD CONTROL UPGRADE

SUMMARY

EC 291158 replaced the existing reactor Control Element Assembly (CEA) Control System with a Westinghouse Advanced Rod Control Hybrid (ARCH) Digital Control System including Ovation Control Logic.

The accidents previously evaluated in the UFSAR that could potentially be affected by this activity are as follows:

- UFSAR Section 15.2.1 “Uncontrolled CEA Withdrawal”
- UFSAR Section 15.2.3 “CEA Drop Accident”
- UFSAR Section 15.2.7 “Loss of External Electrical Load and/or Turbine Stop Valve Closure”
- UFSAR Section 15.2.11 “Excess Load”

The malfunctions of SSCs important to safety previously evaluated in the UFSAR that could potentially be affected by this activity are as follows:

1. Malfunctions resulting in loss or partial loss of RSPT based Rod Position Indication data used by the Operator for compliance with CEA alignment restrictions.
2. Malfunctions resulting in loss or partial loss of RSPT based Rod Position Indication alarms used to alert the Operator to an abnormal CEA alignment.
3. Malfunctions resulting in loss or partial loss of RSPT based interlocks and CEA Motion Inhibit signals.
4. Malfunctions resulting in loss or partial loss of Step Count based Rod Position Indication data used by the Operator for compliance with CEA alignment restrictions.
5. Malfunctions resulting in loss or partial loss of Step Count based Rod Position Indication alarms used to alert the Operator to an abnormal CEA alignment.
6. Malfunctions resulting in loss or partial loss of Step Count based interlocks and Sequential Permissive signals.
7. Malfunctions resulting in loss or partial loss of Core Mimic Rod Position Indication data used by the Operator for assessment of Dropped Rod events.
8. Malfunctions resulting in loss of CEA position control capability needed to maintain normal operating conditions (i.e. RCS temperature) in response to reactivity changes.
9. Malfunctions resulting in loss of CEA position control capability needed for compliance with CEA alignment restrictions.
10. Malfunctions resulting in spurious rod motion.
11. Malfunctions resulting in a dropped rod.
12. Malfunctions resulting in a Turbine Overspeed condition.
13. Malfunctions resulting in a Turbine Trip.
14. Malfunctions resulting in spurious opening of Turbine Governor or Throttle valves.

Qualitative Assessments have been performed for changes associated with the Rod Control, Rod Position Indication and Turbine Control Systems. With the failure likelihood

introduced by the modified SSCs being sufficiently low, there is not more than a minimal increase in the frequency of occurrence of a malfunction of an SSC important to safety or of an accident previously evaluated in the UFSAR.

The accidents and SSC malfunctions previously evaluated in the UFSAR that could potentially be affected by this activity either do not have any resulting radiological consequences or those consequences are bounded by other events which are not adversely affected by this change involving the Rod Control and Turbine Control systems. Therefore, this activity does not result in more than a minimal increase in the radiological consequences of a malfunction of an SSC important to safety or of an accident previously evaluated in the UFSAR.

A qualitative assessment was prepared for each of the five major portions of this overall digital system upgrade (i.e. reed switch position transmitter (RSPT) based RPI, Step Count based RPI, Core Mimic, Rod Control System and Turbine Control System). Each of the five qualitative assessments concluded that the failure likelihood introduced by the changes made to the Rod Control and Turbine Control Systems is sufficiently low. As such, the activity does not introduce any failures that are as likely to happen as those in the UFSAR that can initiate an accident of a different type. Therefore, the activity does not create a possibility for an accident of a different type than any previously evaluated in the UFSAR.

A detailed evaluation of the failure modes and effects of this design change is contained in the qualitative assessment discussed above. The overall conclusion is that there is no credible failure that causes an adverse effect in to the Rod Control or Turbine Control Systems. With the failure likelihood introduced by the modified SSCs being sufficiently low, the activity does not introduce any failures that are as likely to happen as those in the UFSAR that can initiate a malfunction of an SSC important to safety. Therefore, the activity does not create a possibility for a malfunction of an SSC important to safety with a different result from any previously evaluated in the UFSAR.

There are no fission product barrier design basis limits that are associated with or affected by this activity.

There are no methods of evaluation described in the UFSAR that are associated with or affected by this activity.

Regarding Technical Specifications, the following sections of the COLR are associated with this activity:

- Section 2.2: Full Length CEA Position - Misalignment > 15 Inches (TS 3.1.3.1)
- Section 2.3: Regulating CEA Insertion Limits (TS 3.1.3.6)
- Figure 3.1-2: CEA Insertion Limits vs. THERMAL POWER

The replacement Rod Control System and Rod Position Indication System will comply with all COLR requirements. There is no adverse impact on the COLR as a result of this activity.

The following sections of the Technical Specifications are associated with this activity:

- TS 3/4.1.3: Moveable Control Assemblies – Full Length CEA Position
- TS 3.1.3.1: CEA Block Circuit and Full Length (shutdown and regulating) CEAs
- TS 3.1.3.3: CEA Reed Switch and Pulse Counting Position Indicator Channels
- TS 3.1.3.4: CEA Drop Time
- TS 3.1.3.5: Shutdown CEA Insertion Limit
- TS 3.1.3.6: Regulating CEA Insertion Limit

The replacement Rod Control System and Rod Position Indication System will comply with all Technical Specification requirements. There is no adverse impact on the Technical Specifications as a result of this activity.

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 292761

MODIFIED BARNETT CHF CORRELATION IN THE MSLB ANALYSIS

SUMMARY

EC 292761 changes the St. Lucie Unit 1 UFSAR due to a non-conservatism associated with the Modified Barnett CHF Correlation in the MSLB analysis. The use of a different CHF correlation than that described in the UFSAR is considered to be a change to the method of evaluation for performance of safety analyses. Since the change in CHF correlation involves a change to the method of evaluation only, the 10 CFR 50.59 evaluation only addresses criterion viii of 10 CFR 50.59(c)(2), and criteria 10 CFR 50.59(c)(2)(i-vii) are not applicable, consistent with NEI 96-07, Revision 1, Section 4.3.8 guidance.

The use of Biasi CHF correlation for the post-scram MSLB analysis is acceptable as the Biasi CHF correlation is approved by the NRC for the intended application. The Biasi CHF correlation is listed as an approved correlation for MSLB analyses in Section 5.4.1 of EMF-2310(P)(A), which is referenced in St. Lucie Unit 1 Technical Specifications Section 6.9.1.11 as an approved methodology for use in MSLB analyses.

Therefore, the UFSAR changes regarding the use of Biasi CHF correlation in the post-scram MSLB analysis 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.

No Technical Specification change is required.

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 293174

TURBINE VALVE TESTING INTERVAL CHANGE TO NINE MONTHS

SUMMARY

Turbine valve testing ensures that these valves will reliably close when required during a turbine overspeed event. EC 293174 changes the St Lucie Unit 1 turbine valve testing interval from six months to nine months.

The proposed activity does not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR. Per Siemens Technical Report CT-27455 Rev 1, the current total probability of an external missile for the unit at 100,000 hours of inspection interval is 1.88E-6 with a 6-month Turbine Valve Testing Interval. Using the probability of overspeed per year listed in CT-27455 Rev. 1 with a polynomial curve fit, the calculated total probability of an overspeed with a 9-month testing interval is 3.45E-6. According to NEI 96-07 Rev. 1 Section 4.3.1, a licensee shall remain below plant specific criteria. The NRC set limit for probability of an external missile is 1.0E-5 per year or 11.42E-5 per 100,000 hours. A probability of 3.45E-6 for an external missile is less than NRC required limit and is therefore acceptable.

The total probability of a overspeed per year increases from 1.88x10-6 for a 6-month turbine valve testing interval to 3.45E-6 for a 9-month testing interval. The increase is by a factor of 1.84. Per NEI 96-07 Rev 1, a change is considered adverse if the change in likelihood of occurrence of a malfunction increases by more than a factor of two. Since the total probability of an external missile increases by a factor of 1.84 times by changing the turbine valve testing interval to 9 months, this change is not considered more than minimal; therefore, the change is acceptable.

Failure of the turbine stop and control valves to close and prevent a turbine overspeed event are the only malfunctions that could credibly occur due to this activity. These turbine malfunctions do not involve a radiological consequence nor are any radiological consequences postulated as a result of a turbine missile event. Because the probability of occurrence of a turbine missile accident remains within plant specific NRC criteria for this activity, the potential for unacceptable damage is precluded and no increase in radiological consequences are postulated.

The turbine missile is the only accident previously evaluated in the UFSAR that is credibly affected due to this activity. No new failure modes are introduced. Failure of the turbine stop and control valves to close are not an initiator of any accidents other than a turbine missile accident. As such, this activity does not create a possibility for an accident of a different type than any previously evaluated in the UFSAR.

The change in turbine valve test frequency from 6-month intervals to 9-month intervals does not introduce the possibility for a malfunction of a SSC with a different result because the activity does not introduce any new failure modes.

Fission barrier integrity is not adversely impacted by a postulated turbine missile accident. Therefore, this change does not affect a design basis limit for a fission product barrier.

This activity relies on the methodology developed by Siemens Energy Inc. and approved by NRC as described on U1 UFSAR Sec 3.5.3.2. Therefore, this activity does not constitute a departure from a method of evaluation described in the UFSAR.

No Technical Specification change is required.

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

FUEL RELOAD EVALUATION

EC 292529

ST. LUCIE UNIT 1 CYCLE 29 RELOAD

SUMMARY

With the St. Lucie Unit 1 Cycle 29 Core Reload, an analysis input value was changed from previous cycle in a conservative direction, namely the pressurizer backup heaters ON high level setpoint (% deviation from nominal value). This is a change to the plant design basis and UFSAR, and affects the CVCS malfunction and Loss of Normal Feedwater concurrent with AFW pipe break analyses contained in UFSAR 15.2.14 and 10.5, respectively. However, per the 50.59 Screening conclusions, this change is considered ADVERSE only for the CVCS malfunction analysis, thus a 50.59 Evaluation was required.

Regarding the potential for a more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR, the pressurizer heater actuation setpoint value affects the event progression, and any change in this value has no effect on the initiation of the CVCS malfunction event or any other accidents evaluated in the UFSAR. Therefore, the proposed activity does not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR.

The pressurizer heater actuation setpoint does not result in the malfunction of any SSC important to the reanalysis of the CVCS Malfunction event or any other safety evaluated in the UFSAR. Therefore, the proposed activity does not result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR

In the reanalysis of the CVCS Malfunction event, the operator action time was affected but the radiological consequences of the event have not been affected by the design input change. No other accident analysis is affected. Therefore, the proposed activity does not result in more than a minimal increase in the radiological consequences of an accident previously evaluated in the UFSAR.

For the pressurizer heater actuation setpoint in the reanalysis of the CVCS Malfunction event, neither the assumed malfunctions of equipment in the event nor the radiological consequences of the event have been affected by the design input change. No other accident analysis is affected. Therefore, the proposed 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 pressurizer heaters actuation setpoint change cannot create any UFSAR accident including accident of a different type than currently evaluated. Therefore, the proposed activity does not create a possibility for an accident of a different type than any previously evaluated in the UFSAR.

The use of a new value for the pressurizer backup heaters ON high level setpoint does not create a new malfunction of SSC or the possibility for a new malfunction of SSC. Therefore, the proposed does not activity create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in UFSAR.

The only accident of concern for the design input value change is the CVCS malfunction, which was reanalyzed and the acceptance criteria for this event continues to be met. The use of a new value for the pressurizer backup heaters ON high level setpoint does not affect the minimum DNBR value for the CVCS malfunction event, and does not affect any of the other limits for fission product barriers during this event or any other event. Therefore, the proposed activity does not result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered.

The method of evaluation used for the reanalysis of the CVCS Malfunction event is the same as the one used for the previous analysis of record. Therefore, the proposed activity 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.

No Technical Specification change is required.

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.