

November 23, 2015

MEMORANDUM TO: Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Greg A. Casto, Chief */RA/*
Balance of Plant Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

SUBJECT: ST. LUCIE, UNIT 1 AND 2, LICENSE AMENDMENT REQUEST
TO REMOVE COMMUNICATIONS AND MANIPULATOR CRANE
REQUIREMENTS FROM TECHNICAL SPECIFICATION AND
RELOCATE TO LICENCE-CONTROLLED DOCUMENT
(TAC NOS. MF5835 AND MF5836)

By letter dated March 10, 2015, Florida Power and Light Company (FPL) requests to amend Facility Operating Licenses DPR-67 and NPF- 16 for St. Lucie Unit 1 and 2, respectively. The proposed amendment would remove St. Lucie Technical Specifications (TSs) related to communication during core alteration TS 3/4.9.5 and the manipulator crane operability TS 3/4.9.6 and relocate the TS requirements to the St. Lucie Updated Final Safety Analysis Report.

The Balance of Plant Branch (SBPB) has completed its review of the License Amendment Request (LAR). Based on the review, the SBPB staff finds the LAR to be acceptable. The staff's Safety Evaluation input is enclosed.

Docket Nos.: 50-335
50-389

Enclosure:
Safety Evaluation

CONTACT: Gordon L. Curran, NRR/DSS
301-415-1247

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 22 UNIT 1 AND 26 UNIT 2 TO FACILITY OPERATING
LICENSE NO. DPR-67 AND NPF-16
FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE PLANT, UNITS NOS. 1 AND 2
DOCKET NOS. 50-335 AND 50-389

1.0 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the application submitted by Florida Power and Light Company, (FPL - the licensee) to amend the operating license for St. Lucie, Unit No. 1 and 2 by letter dated March 10, 2015 in the (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15084A141).

FPL submitted an evaluation that supports the request to remove Technical Specifications (TSs) Limiting Condition for Operation (LCO) 3/4.9.5, "Communications," from both the St. Lucie Unit 1 and Unit 2 TS; LCO 3/4.9.6, "Manipulator Crane Operability," from the St. Lucie Unit 1 TS; and LCO 3/4.9.6, "Manipulator Crane," from the St. Lucie Unit 2 TS and relocate these TS requirements to the Updated Final Safety Analysis Report (UFSAR) for St. Lucie Unit 1 and the UFSAR for St. Lucie Unit 2.

2.0 REGULATORY EVALUATION

2.1 Regulatory Discussion

Section 182a of the Atomic Energy Act of 1954 (the Act), as amended, requires applicants for nuclear power plant operating licenses to include the TSs as part of the license. The Commission's regulatory requirements related to the content of TSs are set forth in Title 10 of the Code of Federal Regulations (10 CFR) Section 50.36, "Technical specifications." The regulations require that the TSs include items in specific categories, including: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) Surveillances Requirements; (4) design features; and (5) administrative controls. The regulation does not specify the particular requirements to be included in the TSs.

The four criteria defined by 10 CFR 50.36(c)(2)(ii) for determining whether particular items are required to be included in the TS LCOs, are as follows:

- (A) Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the Reactor Coolant Pressure Boundary (RCPB).

ENCLOSURE

(B) Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a Design-Basis Accident (DBA) or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

(C) Criterion 3. A Structure, System, or Component (SSC) that is part of the primary success path and which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

(D) Criterion 4. A SSC which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The regulations in 10 CFR 50.36(c)(2) specify that, when an LCO of a nuclear reactor plant is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition is met.

2.2 System Description

As described in the license application dated March 10, 2015, the Manipulator Crane (also referred to as Refueling Machine) is a traveling bridge and trolley running on rails set in the concrete on each side of the refueling cavity pool inside reactor building. Motors on the bridge and trolley accurately position the machine over each fuel assembly location within the reactor core or fuel transfer carrier. The hoist assembly contains an air operated grappling device which, when rotated by the actuator mechanism, engages the fuel assembly to be removed. The hoist assembly and grappling device are raised and lowered by a cable attached to the hoist winch. During withdrawal or insertion of either a fuel assembly, or a fuel assembly with a control element inserted, the load on the hoist cable is monitored at the console to ensure that movement is not being restricted.

TS 3/4.9.5:

"Communications," provides communications capability to ensure that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during core alterations. As indicated in the license application dated March 10, 2015, the components covered by this LCO include radios and associated power and transmission equipment necessary to establish and maintain communications between the control room and the refueling station. This only applies during core alterations, which can only be conducted with the reactor head removed and the Reactor Coolant System (RCS) depressurized. Additionally, St Lucie UFSAR Section 9.1.4.3 indicates there is direct communication between the control room and the refueling machine console during fuel handling operations, allowing the control room personnel to inform the refueling machine operator of any impending unsafe condition detected from the control room during fuel movement.

TS 3/4.9.6:

"Manipulator Crane Operability," Unit 1 provides requirements for the cranes used for movement of control element assemblies or fuel assemblies to ensure each crane has adequate capacity to lift a fuel assembly and protection against excessive lifting force in the event of an inadvertently stuck assembly during lifting operations.

TS 3/4.9.6

"Manipulator Crane," Unit 2 provides requirements for the refueling machine to ensure manipulator cranes will be used for movement of fuel assemblies; each crane has sufficient load capacity to lift a fuel assembly, with or without a control element assembly; and protection of the core internals and pressure vessel from excessive lifting force in the event that they are inadvertently stuck during lifting operations.

3.0 TECHNICAL EVALUATION

In the application dated March 10, 2015, the licensee stated that the proposed change is to relocate sections of the TS relating to certain refueling requirements. The licensee proposed relocating these refueling sections of the TS to the UFSAR, since these requirements are neither within the scope of equipment included in NUREG-1432, "Standard TSs for Combustion Engineering Plants", nor satisfies the criteria of 10 CFR 50.36(d)(2)(ii) for establishment of a LCO.

The staff agrees that the requirements proposed for relocation to UFSAR are not within the scope of NUREG-1432. The staff 10 CFR 50.36(c)(2)(ii) criteria evaluation is the following:

Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the RCPB boundary.

TS 3/4.9.5:

The requirement related to communications between control room and refueling station are included in LCO 3.9.5 and described above in Section 2.2. The function of the communication equipment is not part of any installed instrumentation that is used to detect abnormal degradation of the RCPB boundary.

TS 3/4.9.6:

The requirements related to manipulator crane (refueling machine) operability are located in LCO 3.9.6 Unit 1 and LCO 3.9.6 Unit 2 and described above in Section 2.2. These requirements are applicable during movement of control element assemblies or fuel assemblies within the reactor pressure vessel, which can only take place with the reactor head removed and the RCS depressurized. None of these operability requirements apply to instrumentation used to detect abnormal degradation of the RCPB boundary.

Therefore, the NRC staff concludes that none of the subject LCOs meet Criterion 1.

Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

TS 3/4.9.5:

Equipment used by personnel to establish and maintain communications between the control room and the refueling station is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, the staff concludes current LCO 3.9.5 does not satisfy Criterion 2 for inclusion in the TSs.

TS 3/4.9.6:

The requirement related to manipulator crane operability LCO 3.9.6 apply when handling fuel assemblies inside containment, since the manipulator crane is unable to access the fuel building.

As noted in license application for Unit 1 USFAR, two DBAs have been identified that could involve the manipulator crane:

1. UFSAR Section 15.3.3, "Inadvertent Loading of a Fuel Assembly into the Improper Position"
2. UFSAR Section 15.4.3, "Fuel Handling Accident"

For Unit 2, DBAs involving the manipulator crane are similarly described in St. Lucie UFSAR Section 15.4.7 and 15.7.4.1.2.

The license application indicates that the manipulator crane may be involved in an accident related to inadvertent loading of a fuel assembly into the improper position, which is analyzed in UFSAR Section 15.3.3 and 15.4.7 for Unit 1 and Unit 2, respectively. LCO 3.9.6 contains operability requirements for crane capacity or excessive lifting force. These operability requirements are not related to the process used to ensure fuel assemblies are moved into the proper position in the core. LCO 3.9.6 does not prevent the misloading of a fuel assembly or otherwise involve the initiating conditions for this accident. Therefore, the NRC staff concludes that LCO 3.9.6 does not meet Criterion 2 for the Inadvertent Loading of a Fuel Assembly into an Improper Position DBA.

As noted by in UFSAR Section 15.4.3 Unit 1 and 15.7.4.1.2 Unit 2, the applicable accident involving the manipulator crane is the postulated Fuel Handling Accident (FHA), which assumes a fuel assembly is dropped as an initial condition. This event consists of the drop of a single fuel assembly either in the Fuel Handling Building (FHB) or inside of Containment. The manipulator crane cannot physically access the FHB, so it plays no role in the FHA postulated to occur there. For a FHA to occur inside of containment, the fuel assembly would be dropped from the manipulator crane. The effects and consequences of the design basis FHA involving the manipulator crane occurring inside containment are described in St. Lucie UFSAR Section 15.4.3 and 15.7.4.1.2 for Unit 1 and Unit 2, respectively. The radiological consequences of the FHA were determined in accordance with the guidance in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating DBAs at Nuclear Power Reactors." The St. Lucie FHA analysis assumed all fuel rods in a single fuel assembly are damaged as a result of the drop. The failure of all fuel rods is a conservative assumption that provides a bounding conditions for determining the potential radiological consequences resulting from any level of damage to a single fuel assembly.

The LCO 3.9.6 associated with the manipulator crane specifies that the crane be operable with a minimum capacity for movement of fuel assemblies and an overload cut-off to protect the reactor vessel internals from excessive uplift force. Since the FHA assumes the manipulator crane drops a fuel assembly, the capacity of the crane is not an initial condition associated with the design basis FHA. Similarly, operation of the overload cutoff is not an initial condition of the design basis FHA because the assumption that all fuel pins are damaged in a single assembly bounds the potential damage to a fuel assembly that could result from excessive uplift forces. Therefore, the NRC staff concludes that LCO 3.9.6 does not meet Criterion 2 for an FHA.

For additional safe handling operation, the manipulator crane has physical, designed-in features that prevent the operators from inadvertently placing the plant in an unanalyzed condition. St. Lucie UFSAR Section 7.6.1.2 Unit 1 and Section 9.1.4.2.1.1 Unit 2 describes interlocks and operational constraints provided with the refueling machine design that interrupts hoisting of a fuel assembly if the load increases above the overload set point. As an additional protective feature, hoisting load is visually displayed so that the operator can manually terminate the operation if an overload or other unsafe condition occurs.

Based on the above, the NRC staff concludes that none of the subject LCOs meets Criterion 2.

Criterion 3. A SSC that is part of the primary success path and which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

TS 3/4.9.5 and TS 3/4.9.6:

The communication and equipment proposed for removal from TS and relocation to license controlled document is not SSCs that is part of the primary success path and which function or actuate to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Similarly, the manipulator crane is used solely during refueling operations with the reactor head removed and do not actuate to mitigate a DBA or transient analysis. Therefore, the NRC staff concludes that none of the subject LCOs meet Criterion 3.

Criterion 4. A SSC which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

TS 3/4.9.5 and TS 3/4.9.6:

The manipulator crane and communication equipment included in the proposed TS change has not been shown in any operating experience or probabilistic risk assessment to be significant to public health and safety. Therefore, the NRC staff concludes that none of the subject LCOs meet Criterion 4.

4.0 CONCLUSION

Based on the evaluation above, the NRC staff finds that TS 3/4.9.5 Unit 1 and 2, TS 3/4.9.6 Unit 1 and TS 3/4.9.6 Unit 2 do not meet the criteria in 10 CFR 50.36(c)(2)(ii) requiring inclusion in the TSs. These changes are in alignment with the latest version of NUREG-1431, Revision 3,

“Standard TSs for Westinghouse Plants,” and do not diminish the level of safety found in the current TSs.

Based on the inclusion in the UFSAR, future changes to relocated TS requirements will be subject to the provisions of 10 CFR 50.59. As such, the NRC staff finds that there is reasonable assurance that future changes to the relocated requirements will be made in a manner that continues to protect public health and safety. Based on the above findings, the NRC staff concludes that relocation of TS 3/4.9.5 Unit 1 and 2, TS 3/4.9.6 Unit 1 and TS 3/4.9.6 Unit 2 to the St Lucie UFSAR is acceptable.