Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

May 21, 2009

L-2009-127
10 CFR 50.90

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

Re: St. Lucie Unit 2
Docket No. 50-389
Application for Technical Specification Modification
Regarding Control Rod Assembly Drop Time

Pursuant to 10 CFR 50.90 and 50.91, Florida Power and Light Company (FPL) requests to amend Facility Operating License NPF-16 for St. Lucie Unit 2.

The amendment would revise the Technical Specification (TS) 3.1.3.4, related to requirements for Control Element Assembly (CEA) drop time. This TS change increases the available margin for CEA drop time testing.

Enclosure 1 provides a description of the proposed change, the requested confirmation of applicability, and plant-specific verifications. Enclosure 2 provides the existing TS pages marked up to show the proposed change. Enclosure 3 provides revised (clean) TS pages. Enclosure 4 provides a summary of the regulatory commitments made in this submittal.

FPL requests approval of the proposed amendment by May 31, 2010, with the amendment being implemented within 60 days of NRC approval.

The license amendments proposed by FPL have been reviewed by the St. Lucie Plant Onsite Review Group. In accordance with 10 CFR 50.91(b)(1), a copy of these proposed license amendments is being forwarded to the State Designee for the State of Florida.

Please contact Mr. Ken Frehafer at (772) 467-7748 if there are any questions about this submittal.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on MAY 21, 2009.

Sincerely,

Gordon L. Johnston
Site Vice-President
St. Lucie Plant

Enclosures:
1. Description and Assessment
2. Proposed Technical Specification Changes
3. Revised Technical Specification Pages
4. Regulatory Commitments

Description and Assessment

1.0 DESCRIPTION

This license amendment request (LAR) modifies the required CEA drop time in Technical Specification (TS) 3.1.3.4 from the current value of 3.1 seconds to a new value of 3.2 seconds for 90% insertion, to accommodate for observed increased CEA drop times.

2.0 ASSESSMENT

Control Element Assembly (CEA) drop time is an input to the UFSAR described safety analysis to mitigate the consequences of certain events, such as the loss of flow, locked rotor, full power steam line break, etc. It is used in a combination of CEA reactivity vs. CEA position to determine the reactivity insertion subsequent to the reactor trip. This trip reactivity used in the safety analysis, in general has significant margin to the actual cycle specific reactivity insertion determined for any cycle. For St. Lucie Unit 2, it is verified that the Cycle 18 trip reactivity determined from the Cycle 18 core design, after accounting for the 10% rod worth uncertainty, continues to meet the safety analysis trip reactivity even with the proposed increase in the CEA drop time by 0.1 seconds. Thus, the delay in the CEA insertion due to the proposed increase in the CEA drop time has no adverse impact on the UFSAR described accident analysis. There are no other adverse effects on any reload analysis and no impact on plant operations, other than the increase in the drop time as proposed.

Provided below is a summary of the evaluation performed for the proposed CEA drop time increase:

Fuel Rod & Thermal-Hydraulic Design

The change in CEA drop time does not impact the power shapes (assumed for Relaxed Axial Offset Control or the safety analyses) or statepoints, hence there is no impact on the thermal hydraulic or fuel rod design analysis done for Cycle 18.

Mechanical Design

There is no impact on the mechanical design due to the slower CEA drop time. The slightly slower drop would produce a smaller impact on the fuel assembly and lower stresses on the CEA. Since there is no adverse impact, current mechanical design analyses remain applicable.

LOCA Analysis

For LOCA, the current limits that support Cycle 18 are not impacted by the increase in CEA drop time. Specifically, the normalized scram reactivity worth vs. CEA % insertion remains applicable for the proposed CEA drop time with no change. A detailed evaluation with respect to the LOCA analyses that support Cycle 18 has been performed, which shows additional margin

beyond the 0.1 second delay offset (shift) to the current CEA rod drop curve. Therefore, the results of the existing LOCA safety analyses are not impacted and remain bounding.

Non-LOCA Transients

The Non-LOCA Safety Analyses do not directly utilize the CEA drop time. Instead a combination of the CEA insertion fraction as a function of time and the CEA insertion fraction as a function of normalized reactivity insertion is modeled. An increase in the CEA drop time will decrease the reactivity inserted for a given time point. However, it is verified that offsetting the rod positions by 0.1 seconds (slower) at all positions, does not preclude meeting the trip reactivity limits used in the non-LOCA analyses. This statement means that the required trip reactivity normalized worth (%Δk) at a given CEA insertion fraction has been confirmed to be available at a lesser insertion fraction corresponding to CEA insertion being slower by 0.1 seconds. This relationship is maintained at all CEA insertion fractions. This ensures that the trip reactivity normalized worth (%Δk) is no more adverse than the current values modeled in the Non-LOCA Safety Analyses. Thus, the Non-LOCA transient analyses remains valid.

Operational Considerations

The proposed change to the CEA rod drop time has no impact on the plant operation other than the time requirement change for the rod drop time testing. Since the slower CEA rod drop time does not require re-performing any of the safety analyses, there is no impact on the overpressure protection considerations.

Conclusion

The reactivity insertion rate continues to be bounded by the curve used for the various safety analyses, despite a 0.1 second delay offset (shift) to the current CEA rod drop curve. Thus, the reactivity insertion for a given revised time point is at least equivalent to the reactivity insertion values utilized in safety analyses. Since the same reactivity insertion is available with the revised CEA drop time curve, the results of the existing safety analyses are not impacted and remain bounding. Since the safety analysis remains bounding, the other areas such as thermal hydraulics, fuel rod design and operations analysis are not impacted. There is no adverse impact on the impact loads on the CEA due to the slower drop times. Therefore, the 0.1 second increase in drop time is acceptable for Cycle 18.

The reactivity insertion with the increased CEA drop time will be verified every cycle as part of the cycle specific reload analysis to comply with the proposed CEA drop time increase.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Determination

Florida Power & Light is requesting adoption of a change to the St. Lucie Unit 2 specific TSs, related to the CEA drop time.

The standards used to arrive at a determination that a request for amendment involves a No Significant Hazards Consideration are included in the Commission's regulation, 10 CFR 50.92, which states that No Significant Hazards Considerations are involved if the operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; nor
(3) Involve a significant reduction in a margin of safety.

As required by 10 CFR 50.91(a), an analysis of the issue of No Significant Hazards Consideration was prepared by Florida Power & Light for this change.

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   The proposed change increases the required CEA drop time. This new CEA drop time requirement must be verified prior to Modes 1 or 2 of plant operations. The probability of an accident previously evaluated remains unchanged since the CEAs drop into the core as a result of a core anomaly or undesired condition, and the fact that the CEA drop time was increased does not in itself initiate an accident. Likewise, the consequences of an accident previously evaluated remain unchanged since for both LOCA and non-LOCA analyses, it has been verified that the proposed slower reactivity insertion rate at all rod positions, will not preclude meeting the trip reactivity limits used in the analyses.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The proposed change will not introduce new failure modes or effects and will not, in the absence of other unrelated failures, lead to an accident whose consequences exceed the consequences of accidents previously analyzed.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

The increase in CEA drop time as proposed in this TS change has been determined to have no adverse impact on the St. Lucie Unit 2 safety analysis described in the UFSAR, and thus, does not have any effect on the existing margins of safety for the fuel, the fuel cladding, the reactor vessel, or the containment building. The change in CEA drop time does not impact the power shapes (assumed for Relaxed Axial Offset Control or the safety analyses) or statepoints, hence there is no impact on the thermal hydraulic or fuel rod design analysis. There is no impact on the mechanical design. The slightly slower drop would produce a smaller impact on the fuel assembly and lower stresses on the CEA. Since there is no adverse impact, current mechanical design analyses remain applicable.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on this analysis, it was determined that the proposed amendment does not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any previously evaluated; nor (3) involve a significant reduction in a margin of safety. Therefore, the amendment does not involve a significant hazards consideration.

3.2 Applicable Regulatory Requirements/Criteria

The regulations (10 CFR Part 50) do not deal explicitly with startup testing. However, the CEA drop time (a quantity measured and validated in the startup tests) is in the TSs, and therefore, is subject to regulatory oversight.

According to the Unit 2 UFSAR, the control element assemblies were designed to comply with General Design Criteria (GDC) related to equipment safety functions (GDCs 1, 2, 14, 29), suppression of reactor power oscillations (GDC 12), instrumentation and control equipment (GDC 13), protection systems (GDCs 20, 23, 25), and reactivity control systems (GDCs 10, 26, 27, 28). As discussed below, the change provided in this TS amendment does not affect the conclusions provided in the UFSAR, and the CEAs and related systems continue to comply with the regulation.

GDCs 1, 2, 14, 29 – Equipment safety functions: These GDCs, as they relate to the CEA system, require that the CEAs be designed to quality standards commensurate with the importance of the safety functions in the event of anticipated operational occurrences (AOOs); be designed to withstand the effects of an earthquake without loss of capability to perform its safety functions;

the reactor coolant pressure boundary (RCPB) portion of the CEA system shall be designed, constructed, and tested for the extremely low probability of leakage or gross rupture; and the CEAs shall be designed to assure an extremely high probability of accomplishing their safety functions. As the only parameter that is being changed in this LAR is the maximum allowable CEA drop time from 3.1 to 3.2 seconds (to 90% insertion), none of the above requirements are being affected.

GDC 12 - Reactor power oscillations: This GDC requires that the reactor core and associated coolant, control, and protection systems shall be designed to assure that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are not possible or can be reliably and readily detected and suppressed. The CEAs will continue to provide fundamental mode stability even after this TS change. Likewise, there is no change to the ability of the CEAs to suppress the axial mode oscillations.

GDC 13 - Instrumentation and control equipment: This GDC requires that instrumentation be provided to monitor variables and systems over their anticipated ranges for normal operation, for AOOs, and for accident conditions to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the RCPB, and the containment and its associated systems. According to the UFSAR, manual and automatic control of reactor power by means of CEAs is provided (among other systems) to monitor and maintain control over the fission process during both transient and steady state periods over the lifetime of the core. The manual and automatic control by means of CEAs is not affected by the increase in maximum allowable CEA drop time from 3.1 to 3.2 seconds (to 90% insertion).

GDCs 20, 23, 25 - Protection systems: These GDCs require that the plant protection system be designed: (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of AOOs, (2) to sense accident conditions and to initiate the operation of systems and components important to safety, (3) to fail into a safe state or into a state demonstrated to be acceptable on some other defined basis, and (4) to assure that specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal of control rods. In order to support these GDCs, the UFSAR states that a reactor trip is accomplished by de-energizing the control element drive mechanism (CEDM) bolting latch coils through the interruption of the CEDM power supply. The CEAs are, thus, released to drop into the core reducing reactor power. Also, a loss of power to the CEDM holding coils results in gravity insertion of the CEAs into the core. The rate of negative reactivity insertion with the propose change remains greater than that used in the safety analysis. Reactor shutdown with CEAs is accomplished completely independent of the control functions since the trip breakers interrupt power to the CEDM regardless of existing control signals. The above functions continue to be available even with the change in TS provided in this LAR.

GDCs 10, 26, 27, 28 - Reactivity control systems: These GDCs require that one of two reactivity control systems shall use control rods, preferably including a positive means for inserting the

rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including AOOs, and with appropriate margin for malfunctions such as stuck rods, specified acceptable safety fuel design limits (SFDL) are not exceeded. The reactivity control systems shall be designed to have a combined capability, in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to shutdown the reactor and cool the core is maintained. The reactivity control systems shall also be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the RCPB greater than limited local yielding nor (2) sufficiently disturb the core, its support structures, or other reactor pressure vessel internals to impair significantly the capability to cool the core.

According to the UFSAR and to support the above requirements, the CEAs are inserted into the reactor core by a positive means (gravity) and they are capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including specified AOOs, specified acceptable SFDLs are not exceeded. The CEAs can also be mechanically driven into the core. The appropriate margin for stuck rods is provided by assuming in the analyses of AOOs that the highest worth CEA does not fall into the core. In addition, the Safety Injection System, in conjunction with the combined capabilities of the reactivity control systems is available to maintain short and long term cooling of the core even in the event a CEA of highest worth is stuck out of the core. None of the above functions of the CEAs are altered or affected by the TS change provided in this LAR.

In conclusion, on the basis of the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4.0 ENVIRONMENTAL EVALUATION

A review has determined that the amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is required in connection with the proposed amendment.

ENCLOSURE 2
Proposed Technical Specification Changes

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REACTIVITY CONTROL SYSTEMS

CEA DROP TIME

3.2

LIMITING CONDITION FOR OPERATION

3.1.3.4 The individual full-length (shutdown and regulating) CEA drop time, from a fully withdrawn position, shall be less than or equal to ~~3.1~~ seconds from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches its 90% insertion position with:

a. T_{avg} greater than or equal to 515°F, and

b. All reactor coolant pumps operating.

APPLICABILITY: MODES 1 and 2.

ACTION:

a. With the drop time of any full-length CEA determined to exceed the above limit:

1. If in MODE 1 or 2, be in at least HOT STANDBY within 6 hours, or

2. If in MODE 3, 4, or 5, restore the CEA drop time to within the above limit prior to proceeding to MODE 1 or 2.

b. With the CEA drop times within limits but determined at less than full reactor coolant flow, operation may proceed provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of CEA drop time determination.

SURVEILLANCE REQUIREMENTS

4.1.3.4 The CEA drop time of full-length CEAs shall be demonstrated through measurement prior to reactor criticality:

a. For all CEAs following each removal and installation of the reactor vessel head,

b. For specifically affected individuals CEAs following any maintenance on or modification to the CEA drive system which could affect the drop time of those specific CEAs, and

c. At least once per 18 months.

ENCLOSURE 3
Revised Technical Specification Pages

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REACTIVITY CONTROL SYSTEMS

CEA DROP TIME

LIMITING CONDITION FOR OPERATION

3.1.3.4 The individual full-length (shutdown and regulating) CEA drop time, from a fully withdrawn position, shall be less than or equal to 3.2 seconds from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches its 90% insertion position with:

a. T_{avg} greater than or equal to 515°F, and

b. All reactor coolant pumps operating.

APPLICABILITY: MODES 1 and 2.

ACTION:

a. With the drop time of any full-length CEA determined to exceed the above limit:

1. If in MODE 1 or 2, be in at least HOT STANDBY within 6 hours, or

2. If in MODE 3, 4, or 5, restore the CEA drop time to within the above limit prior to proceeding to MODE 1 or 2.

b. With the CEA drop times within limits but determined at less than full reactor coolant flow, operation may proceed provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of CEA drop time determination.

SURVEILLANCE REQUIREMENTS

4.1.3.4 The CEA drop time of full-length CEAs shall be demonstrated through measurement prior to reactor criticality:

a. For all CEAs following each removal and installation of the reactor vessel head,

b. For specifically affected individuals CEAs following any maintenance on or modification to the CEA drive system which could affect the drop time of those specific CEAs, and

c. At least once per 18 months.

ENCLOSURE 4
Regulatory Commitments

The following table identifies those actions committed to by Florida Power & Light in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments. Please direct questions regarding these commitments to Mr. Eric Katzman, Licensing Manager, St. Lucie Plant.

REGULATORY COMMITMENTS	DUE DATE/EVENT
Florida Power & Light will modify Technical Specification 3.1.3.4, consistent with the licensing amendment.	To be implemented within 60 days of NRC approval of the amendment.