



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

December 10, 2009

L-2009-284  
10 CFR 50.59

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

Re: St. Lucie Unit 2  
Docket No. 50-389  
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 50.59 evaluation of each which were made on Unit 2 during the period of April 4, 2008 through June 13, 2009. St. Lucie Unit 2 Updated Final Safety Analysis Report (UFSAR) Amendment 19 is being submitted under separate cover.

Please contact us should there be any questions regarding this information.

Sincerely,

Eric S. Katzman  
Licensing Manager  
St. Lucie Plant

ESK/tlt

Attachment

IE47  
NRS

**ST. LUCIE UNIT 2  
DOCKET NUMBER 50-389  
CHANGES, TESTS AND EXPERIMENTS  
MADE AS ALLOWED BY 10 CFR 50.59  
FOR THE PERIOD OF  
APRIL 4, 2008 THROUGH JUNE 13, 2009**

## 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 4, 2008 through June 13, 2009.

This report is divided into three (3) sections. First, changes to the facility as described in the Updated Final Safety Analysis Report (UFSAR) performed by a Plant Change/Modification (PC/M). 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 PC/M. Third, a summary of any fuel reload 50.59 evaluation.

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

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### **SECTION 3**

### **RELOAD EVALUATION**

**PLANT CHANGE/MODIFICATION 08033**

**REVISION 0**

**ST. LUCIE UNIT 2 CYCLE 18 RELOAD**

**Summary:**

This engineering package (EP), provides the reload core design for St. Lucie Unit 2 Cycle 18 developed by Florida Power & Light Company (FPL) and Westinghouse Electric Co. (W). The Cycle 18 core is designed for a nominal cycle length of 12,430 to 12550 EFPH, based on a nominal Cycle 17 length of 11,000 EFPH. The Cycle 18 reload design supports an additional end-of-cycle coastdown length of 400 EFPH with a maximum reduction in primary coolant inlet temperature to 535 °F.

The primary design change to the core for Cycle 18 is the replacement of 77 irradiated fuel assemblies (5 Region S assemblies, 68 Region T assemblies and 4 Region U assemblies) with 76 fresh fuel assemblies (Region Y), and 1 irradiated Region S fuel assembly currently residing in the spent fuel pool (discharged in Cycle 14). The fuel in the Cycle 18 core is arranged in a low leakage pattern. The mechanical design of Region Y fuel is essentially the same as that of the Region X fuel, and consists of "value-added" fuel pellets and the "guardian grid" design, first introduced in Cycle 11. Region Y is the second region with ZIRLO™ cladding, and the third region with Inconel Top Grid. Cycle 18 will have Inconel top grid fuel at all core peripheral locations.

There are no major changes being implemented in Cycle 18 impacting Cycle 18 reload as it relates to safety analysis, licensing, fuel mechanical design, and operations considerations. Cycle 18 core design will include radial enrichment zoning (REZ) in the Region Y fuel to gain margin in steaming rate to improve fuel performance with respect to fuel rod corrosion and crud deposition. Higher levels of crud have been observed in the industry during second cycle operation following replacement steam generators (RSG), resulting in crud induced corrosion failures. Although this is first time application of REZ in Unit 2, radial zoning has been used widely in the industry, including St. Lucie Unit 1, which has implemented radial zoning for several cycles.

The implementation instructions provided in this EP for core reconfiguration from Cycle 17 to Cycle 18 support a full core off-load. The safety analysis of this design was performed by W and by FPL using NRC approved methodologies. The RCS flow in the COLR is being changed by this EP from 335,000 gpm to 375,000 gpm to take credit of the higher measured flow with the RSGs to gain analysis margin. Due to the implementation of REZ for Cycle 18, the LBLOCA analysis has been reanalyzed. The core design and the generation of physics inputs to safety are performed by FPL using the Westinghouse physics methodology.

The Cycle 18 reload is based on the Westinghouse WCAP-9272, Westinghouse

Reload Safety Evaluation Methodology, first introduced in Cycle 15 for St. Lucie Unit 2. This approach uses a checklist format to assess cycle-specific core design, and plant parameters for compliance with the existing safety analysis.

This PC/M supports the continued implementation of the Startup Test Activity Reduction (STAR) program for St. Lucie Unit 2 to allow for the elimination of rod worth measurements during zero power physics testing, following refueling. The evaluation is based on the STAR program approved by the NRC for the participating Combustion Engineering designed pressurized water reactors, which includes St. Lucie Unit 2. The NRC has approved the Alternative Source Term (AST) methodology dose consequence analysis for St. Lucie Unit 2 in License Amendment 152. The input assumptions used in the AST radiological analysis of the UFSAR events bound the Cycle 18 reload design. Thus, the dose consequences of the UFSAR events are not adversely affected by the implementation of the Cycle 18 reload.