December 3, 2014

L-2014-360
10 CFR 50.4
10 CFR 50.55a

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

Re: St. Lucie Unit 1
Docket No. 50-335
Inservice Inspection Plan
Fourth Ten-Year Interval Unit 1 Relief Request No. 9, Revision 0

Pursuant to 10CFR50.55a(a)(3)(ii), Florida Power & Light (FPL) requests approval to perform the examination of the reactor vessel bottom head area and piping in covered trenches at different plant conditions than those required by the ASME Code.

The attachment to this letter provides FPL's justification for this relief request.

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

Sincerely,

Eric S. Katzman
Licensing Manager
St. Lucie Plant

Attachment
ESK/KWF

cc: USNRC Regional Administrator, Region II
USNRC Senior Resident Inspector, St. Lucie Units 1 and 2

A047
NRR

St. Lucie Unit 1
FOURTH INSPECTION INTERVAL
RELIEF REQUEST NUMBER 9, REV. 0

Proposed Alternative
In Accordance with 10CFR50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty without Compensating Increase in Level of Quality or Safety--

1. ASME Code Components Affected

St. Lucie Unit 1 reactor vessel and associated Class 1 and Class 2 piping in covered trenches rendered inaccessible due to containment building configuration.

Exam Cat.	Item Nos.	Examination Description
B-P	B15.10	Reactor Vessel – Pressure Retaining Boundary Bottom Head Area (Carbon Steel) Piping - Pressure Retaining Boundary (covered portions only) SI Headers 12"-SI-148 (Stainless Steel), 12"-SI-149 (Stainless Steel), 12"-SI-150 (Stainless Steel), 12"-SI-151 (Stainless Steel) Charging 2-CH-147 (Stainless Steel) Letdown 2-RC-142 (Stainless Steel)
C-H	C7.10	Piping - Pressure Retaining Components (covered portions only) SDC Suction 10"-SI-420 (Stainless Steel), 10"-SI-422 (Stainless Steel)

2. Applicable Code Edition and Addenda

The Code of record for St. Lucie Unit 1 (PSL-1) is the 2001 Edition with 2003 Addenda of the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components."

3. Applicable Code Requirement

The requirements for performing visual examinations in conjunction with the pressure testing of Class 1 and 2 components are provided in ASME Section XI, Articles IWA-5000, IWB-5000 and IWC-5000.

Paragraph IWA-5241(b) states the following:

> *"For components whose external surfaces are inaccessible for direct VT-2 visual examination, only the examination of the surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage shall be required."*

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Paragraph IWA-5242(c) states the following:

"When examining insulated components, the examination of the surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage, or other areas to which such leakage may be channeled, shall be required."

Paragraph IWB-5221(a) states the following:

"The system leakage test shall be conducted at a pressure not less than the pressure corresponding to 100% rated reactor power."

Paragraph IWC-5221 states the following:

"The system leakage test shall be conducted at the system pressure obtained while the system, or portion of the system, is in service performing its normal operating function or at the system pressure developed during a test conducted to verify system operability (e.g., to demonstrate system safety function or satisfy technical specification surveillance requirements).

4. Reason for Request

St. Lucie Plant does not have access for a direct visual examination of the reactor vessel bottom area during the ASME Section XI System Leakage Test visual examination VT-2 walkdown. There are three possible pathways that lead to the area. Two are in the electrical tunnel at the bottom of the containment "keyway" and are blocked by the reactor cavity relief dampers (blast dampers). These dampers consist of horizontal louvers approximately 11-inch wide and normally remain in the closed position. They are not intended for human passage. The third pathway is through the reactor cavity sump, a small tunnel from the cavity to the weir pit. A cooling duct runs through this tunnel limiting the height to a crawl space to approximately one foot high and six to eight feet long. Ambient conditions during VT-2 examinations at normal operating conditions create an extreme heat stress environment and, combined with a nearly impossible exit pathway, make examination of this area an excessively hazardous work situation. For these reasons, St. Lucie VT-2 inspectors have considered the reactor bottom area to be inaccessible for examination at normal operating conditions. The increase in the level of quality and safety gained by performing a visual inspection at normal operating conditions does not compensate for the safety hazard the inspector would be subjected to.

Some segments of Class 1 and Class 2 reactor support piping pass through trenches that are covered and secured during normal operation. These trenches are required to be covered and secured prior to entering Mode 4 following a shutdown to ensure containment sump recirculation flowpaths are maintained. This is outlined in the St. Lucie response to NRC Bulletin 2003-01 (FPL Letter L-2003-201). The trench covers prohibit direct examination of horizontal insulation joints and low points as directed by IWA-5242(b). However, due to gaps and handholes in the trench covers and the use of grating in some locations, surrounding areas can be observed for evidence of leakage. Areas to which leakage may be channeled are also open in many locations throughout

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the containment for observation during the system leakage test. This is in compliance with the requirements of IWA-5242(c).

5. Proposed Alternative and Basis for Use

Proposed Alternative

Pursuant to 10CFR50.55a(a)(3)(ii), FPL requests approval to perform the examination of the reactor vessel bottom head area and piping in covered trenches at different plant conditions than those required by the ASME Code. FPL will continue to perform the required system pressure tests as prescribed by IWB-5000 each refueling outage and IWC-5000 each period, and will examine all accessible components in accordance with IWA-5241.

For those portions of components rendered inaccessible by containment building configuration, as an alternative to the requirements of IWA-5241, IWB-5221(a), and IWC-5221, FPL has been and will continue to open the inaccessible areas each refueling outage and perform a VT-2 examination of the reactor vessel bottom and other associated piping following plant cooldown and depressurization. This inspection will check insulation surfaces and joints for signs of leakage or residue. Any evidence of leakage will be evaluated in accordance with IWA-5250, which may include additional inspections and insulation removal as deemed necessary.

Basis for Use

The objective of the required visual examination at normal operating conditions is to detect evidence of leakage and thereby verify the integrity of the reactor coolant system (RCS) pressure boundary. FPL believes the same evidence of leakage can be identified by visual examination following cooldown for refueling.

The St. Lucie reactor has no bottom head penetrations, and the vessel welds have been volumetrically examined in accordance with the rules of Section XI with no relevant indications identified. There is no expectation of leakage due to the solid configuration of the bottom of the reactor pressure vessel. In addition, the reactor cavity is monitored for leakage continuously during operation, and inventory balance is performed daily throughout the operating cycle. Therefore, FPL concludes that the proposed alternative provides reasonable assurance of system integrity and an acceptable level of quality and safety comparable to an examination performed at normal operating conditions.

The primary method for quantifying and characterizing RCS identified and unidentified leakage is by means of a reactor coolant water inventory balance. The inventory balance is performed as required by St. Lucie Unit 1 Technical Specification (TS 4.4.6.2 c) at least once every 72 hours except when operating in the shutdown cooling mode (not required to be performed until 12 hours after establishment of steady state operation). However, the St. Lucie surveillance procedure requires the inventory balance be performed once every 24 hours since it provides the best and earliest trend of an increase in RCS leakage. The procedure methods use the recommendations and

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guidance in WCAP-16423-NP (ADAMS ML070310084) and WCAP-16465-NP (ADAMS ML070310082). The leak rate calculated using water balance inventory method is the most sensitive of the methods available with the leak rate calculated to the nearest 0.01 gallons-per-minute (gpm).

St. Lucie Unit 1 RCS inventory balance procedure ensures that RCS leakage is within Technical Specification 3.4.6.2. The procedure also provides early detection of negative trends based on statistical analysis. The inventory balance leak rate calculation is performed more frequently (at a 24 hour rather than 72 hour interval) than required by Technical Specification 4.4.6.2.c.

Action levels on the absolute value of unidentified RCS inventory balance (from surveillance data) are as follows:

Action Level 1
-An adverse trend over time is observed
-Seven day rolling average of UNIDENTIFIED Leak Rate is greater than 0.1 gpm.
-Nine consecutive RCS UNIDENTIFIED Leak Rates greater than the baseline mean (μ) value.

Action Level 2
-Two consecutive UNIDENTIFIED Leak Rates greater than 0.15 gpm.
-Two of three consecutive UNIDENTIFIED Leak Rates greater than the baseline mean plus two times the standard deviation ($\mu + 2\sigma$).

Action Level 3
-One UNIDENTIFIED Leak Rate greater than 0.30 gpm
-One UNIDENTIFIED Leak Rates greater than the base line mean value plus three times the standard deviation ($\mu + 3\sigma$).

These action levels trigger condition report initiation, various investigations of leakage up to and including containment entry to identify the source of the leakage.

RCS leak detection at St. Lucie Unit 1 is also provided by three separate monitoring systems: 1) reactor cavity (containment) sump inlet flow monitoring system; 2) containment atmosphere radiation gas monitoring system; 3) and containment atmosphere radiation particulate monitoring system. These systems have high level and alert status alarms in the control room. These systems also have Technical Specification required monitoring (TS 4.4.6.2 a. & b) at least once every 12 hours. The sensitivity of the containment atmosphere radiation monitoring system depends on the amount of radioactivity in the primary coolant system which is dependent on the percentage of failed fuel. Calculation results conclude that the containment atmosphere radiation monitors are capable of detecting a change of 1 gpm in the leak rate within one hour using design basis reactor water activity assuming 0.1% failed fuel.

The containment sump alarm response is also highly variable based on the location of the leak, how much vapor condenses and where it condenses. All drains entering the

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sump are routed first to a measurement tank. When the water level corresponding to 1 gpm or more into the tank is reached, a sump level alarm is actuated in the control room. The combination of Technical Specification required inventory balance, reactor cavity sump monitoring, gas and particulate monitoring systems provide diverse measurement means for acceptable monitoring of RCS leakage.

In addition, the St. Lucie Unit 1 Technical Specification was revised to the extent practical to meet the improvements of NRC approved revision 3 to Technical Specification Task Force (TSTF) Standard Technical Specification (STS) Change Traveler-513 to define new time limit for restoring inoperable RCS leakage detection instrumentation to operable status and to establish alternate methods of monitoring RCS leakage when one or more required systems are inoperable (Ref. St. Lucie Letter L-2011-073 dated March 11, 2011, ADAMS ML11087128).

The NRC concluded in the safety evaluation that the changes to the St. Lucie Unit 1 Technical Specifications were acceptable and that "The proposed actions for inoperable RCS leakage detection instrumentation maintain sufficient continuity, redundancy, and diversity of leakage detection capability that an extremely low probability of undetected leakage leading to pipe rupture is maintained. This extremely low probability of pipe rupture continues to satisfy the basis for acceptability of LBB in GDC 4." (NRC Issuance of Amendments regarding TSTF-513 Revision 3, dated 3-30-2012, ML12052A22)

There is no plant-specific, NextEra fleet, or industry operating experience regarding potential degradation specific to the items included in this relief request. However, isolated occurrences of stress corrosion cracking have occurred in stainless steel materials in the industry. To address the concerns of these isolated cases, the periodic inspections made possible by removal of the access limitations provides assurance that any isolated degradation would be identified at the onset before a safety concern could develop.

6. Duration of Proposed Alternative

FPL will implement the alternative requirements during the fourth 10-year Inservice Inspection interval at PSL-1 which began February 11, 2008 and ends February 10, 2018.

7. Precedents

This alternative was previously authorized by the NRC at St. Lucie during the Unit 1 Third Inservice Inspection Interval, Relief Request No. 25, and the Unit 2 Third Inservice Inspection Interval, Relief Request No. 4, in a Safety Evaluation Report dated April 13, 2004, ADAMS Accession No. ML041040851.

8. Attachments to the Request

None