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

March 8, 2012

L-2012-093
10 CFR 50.90

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

Re: St. Lucie Plant Unit 1
Docket No. 50-335
Renewed Facility Operating License No. DPR-67

Response to NRC Steam Generator Tube Integrity and Chemistry Branch (CSGB) Request for Additional Information Regarding Extended Power Uprate License Amendment Request

References:

(1) R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2010-259), "License Amendment Request for Extended Power Uprate," November 22, 2010, Accession No. ML103560419.

(2) Email from T. Orf (NRC) to C. Wasik (FPL), "St. Lucie 1 EPU - draft RAIs SG Tube Integrity and Chem. Engineering Branch (CSGB)," February 21, 2012.

By letter L-2010-259 dated November 22, 2010 [Reference 1], Florida Power & Light Company (FPL) requested to amend Renewed Facility Operating License No. DPR-67 and revise the St. Lucie Unit 1 Technical Specifications (TS). The proposed amendment will increase the unit's licensed core thermal power level from 2700 megawatts thermal (MWt) to 3020 MWt and revise the Renewed Facility Operating License and TS to support operation at this increased core thermal power level. This represents an approximate increase of 11.85% and is therefore considered an extended power uprate (EPU).

By email from the NRC Project Manager dated February 21, 2012 [Reference 2], additional information related to spent fuel pool Metamic™ inserts was requested by the NRC staff in the Steam Generator Tube Integrity and Chemical Engineering Branch (CSGB) to support their review of the EPU License Amendment Request (LAR). The request for additional information (RAI) identified three questions. The response to these RAIs is provided in the attachment to this letter.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-259 [Reference 1].

A001
NRR

This submittal contains no new commitments.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the designated State of Florida official.

Should you have any questions regarding this submittal, please contact Mr. Christopher Wasik, St. Lucie Extended Power Uprate LAR Project Manager, at 772-467-7138.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed on 08-March-2012

Very truly yours,

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachment

cc: Mr. William Passetti, Florida Department of Health

Response to NRC Steam Generator Tube Integrity & Chemical Engineering Branch Request for Additional Information

The following information is provided by Florida Power & Light Company (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support the review of the Extended Power Uprate (EPU) License Amendment Request (LAR) for St. Lucie Unit 1 that was submitted to the NRC by FPL via letter L-2010-259 dated November 22, 2010 (Accession Number ML103560419).

In an email dated February 21, 2012 from T. Orf (NRC) to C. Wasik (FPL), Subject: St. Lucie 1 EPU - draft RAIs SG Tube Integrity and Chem. Engineering Branch (CSGB), the NRC staff requested additional information regarding FPL's request to implement the EPU. The RAI consisted of three questions from the NRC's Steam Generator Tube Integrity & Chemical Engineering Branch (CSGB). These three RAI questions and the FPL responses are documented below.

CSGB-10

In the letter dated November 22, 2010, the licensee stated the following:

> ***The new criticality analysis also considers the inclusion of rack enhancements that equip the storage cells with inserts made of the metallic neutron absorber Metamic™ or full-length full-strength CEA or equivalent (5 absorber rods).***

It is unclear to the staff what the meaning of "equivalent" is in the above statement.

a) **Please clarify what is meant by equivalent with respect to the 5 absorber rods and the CEA.**

b) **If a CEA will not be used, please provide the materials that will be associated with the equivalent hardware and a justification for why it is acceptable for use in the SFP.**

Response

a) The CEAs credited in the SFP criticality analysis are the St. Lucie Unit 1 5-finger CEAs which have 5 absorber rods. To allow an option of using only the absorber rods (5), having the same design and material as that of the CEA absorber rods, with no hardware that exists in the CEA assembly, the wording "or equivalent (5 absorber rods)" was included in the updated Technical Specifications. This option will meet the same absorber rods requirement as that of a CEA assembly.

b) The absorber rods will be of the same design and material as that of the CEA absorber rods. There will not be any other material/hardware associated with this option.

CSGB-11

In the letter dated December 27, 2011, the licensee stated:

> ***A coupon tree will be installed that holds 10 coupons in the SFP. The coupons are identical in composition and manufacturing process as the Metamic™ inserts. The coupon tree will be placed in a SFP cell in a location that will ensure a representative dose to the coupons. In addition, this location will simulate the flow characteristics, and pool chemistry that the Metamic™ inserts placed in the SFP will experience. The cell location will be in Region 2 of the SFP which typically has highly burned permanently discharged fuel.***

In order to have an effective coupon program the sample coupons should be placed in the SFP in a location where they will receive the maximum dose and flux possible to bound the conditions seen by all the inserts used in the SFP. This allows for reasonable assurance that if the monitoring program were to detect degradation in the coupons, the appropriate corrective actions can be taken to mitigate the degradation of the inserts.

a) **Please discuss what is meant by "representative dose" with respect to the placement of the coupon tree in the SFP racks.**

b) **Please justify the placement of the coupon tree in an alternative location if it is not placed in an environment that bounds SFP conditions for all inserts.**

Response

a) Region 1 of the SFP is considered inappropriate for the placement of a coupon tree in that it is mostly empty and typically these racks are used only during refueling evolutions to accommodate assemblies temporarily offloaded from the core. Thus, the typical fuel bundle resides in Region 1 only for a short period of time. Additionally, few, if any, Metamic™ inserts will ever be placed in Region 1 racks.

   Region 2 of the SFP, where most of the Metamic™ inserts will be placed, is used for the storage of permanently discharged fuel assemblies with typical burnups in excess of 35000 MWD/MTU. The assemblies in Region 2, including the assemblies placed in cells with inserts, typically remain in the same location for a period of greater than 5 years, and until removed to dry cask storage. The inserts are thus not exposed to freshly discharged assemblies in an as severe configuration as the coupons as described below.

   In deciding on the location of the placement of a coupon tree and the characteristics of fuel assemblies in cells surrounding the cell containing the coupon tree, important factors of consideration are the accumulated dose and the flux. Proximity to higher burned fuel will yield a higher dose, whereas positioning near higher reactivity fuel increases the localized flux.

   Achieving a combined effect of a greater accumulated dose and higher flux exposure to the coupons, placed in a specific cell location, requires that fuel assemblies placed in cells adjacent to the coupon tree be a combination of higher reactivity fuel and high burned fuel. FPL will achieve this combined effect by placing most recent freshly discharged assemblies in at least two of the four cells, face-adjacent to the Region 2 cell containing

the coupon tree. Other cells, face-adjacent to the coupon tree, will be loaded with discharged fuel assemblies cooled for no more than 5 years. These assemblies will meet the above stated requirements as they are expected to have burnups in excess of 35,000 MWD/MTU from dose considerations, and will have cooling time of 0 to a maximum of 5 years from reactivity considerations. This configuration of the coupon tree surrounded by recently discharged assemblies, including freshly discharged assemblies in two adjacent cells without a CEA or Metamic™ insert, will create an environment that is expected to bound all inserts.

The environment established around the coupons would provide reasonable assurance that, if the monitoring program were to detect degradation in the coupons, proper corrective actions can be taken to mitigate the degradation of the inserts prior to any insert falling below the design requirements.

b) The location of coupon tree in the environment, as discussed in the response to CSGB-11a, will provide reasonable assurance that any degradation detected by the coupon monitoring program will effectively allow FPL to take appropriate corrective actions to mitigate degradation of the inserts.

CSGB-12

Please provide the following:

a) The physical dimensions of the coupons to be used in the SFP. Will some of the coupons have a formed chevron cross-section similar to inserts used in the SFP? If not, please justify how the coupons are representative of the inserts in the SFP.

b) Will there be coupons that simulate potential galvanic coupling that may be seen by the inserts in the SFP? If not, please provide justification for how the coupons are representative of the inserts in the SFP.

Response

a) The Metamic™ coupons are 8 inches tall by 6 inches wide. The coupon thickness is 0.070 inches, which is the same thickness as the Metamic™ inserts. There are a total of 10 Metamic™ coupons installed on the coupon tree.

The Metamic™ coupons do not include a formed chevron cross-section. The coupons are a flat, rectangular panel. As stated in the response to RAI CSGB-7 (reference FPL letter L-2011-523, ML11364A044), the coupons will be used for the physical measurement inspection (height, width, thickness, and weight) and neutron attenuation testing aspects of the surveillance program. The most important physical measurement parameter is material thickness to monitor the potential for swelling. The thickness of the Metamic™ coupon (0.070 inches) is the same thickness as the Metamic™ inserts. The coupons and inserts are also made from the same material. Therefore, the coupons are representative of the inserts for this critical dimensional check. The remaining coupon measurement parameters (height, width, and weight) serve a supporting role and are utilized to identify early indications of the potential onset of neutron absorber degradation. These parameters will be measured before the coupons are installed in the spent fuel pool, and subsequently checked during future coupon inspections. The relative change in these

measured parameters will be evaluated as part of the surveillance program. For these reasons, the coupons do not have to replicate the exact geometry of the inserts.

b) As stated in the response to RAIs CSGB-5b and CSGB-7, the visual inspection aspects of the Metamic™ surveillance program will be performed on a representative sample of the actual Metamic™ inserts. These visual inspections of the Metamic™ inserts will be sufficient to detect evidence of galvanic coupling. Visual inspection of the actual inserts rather than the coupons is the preferred method to detect any potential for galvanic coupling as they eliminate the need to simulate area ratio and proximity effects to other dissimilar materials in the spent fuel pool (fuel assemblies, spent fuel pool racks, etc.). For these reasons, the Metamic™ coupons will not be used as a means to detect galvanic coupling.