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

September 29, 2008

L-2008-214
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
RAI Response to Unit 1 Fourth Ten-Year Interval
Relief Request 3 (TAC No. MD9268)

On April 9, 2008, FPL submitted a relief request regarding inspection requirements for a reinforced vinyl ester liner that was installed on the bottom of the Unit 1 Refueling Water Tank (RWT) in 1994. The NRC approved the use of this liner as an alternative non-Code repair for the second and third ten-year ISI inspection intervals via approval of Relief Requests (RR) 13, RR-07, and RR-7A. On September 18, 2008, a teleconference was held between FPL and the NRC to discuss staff questions on the April 9, 2008 submittal. The attachment to this letter provides a response to the request for additional information.

FPL requests that the relief request be approved prior to Unit 1 entry into Mode 4 during the upcoming fall 2008 refueling outage, tentatively scheduled for early November.

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

A047
NRR

FPL RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI) QUESTIONS ST. LUCIE UNIT 1 REFUELING WATER TANK (RWT) BOTTOM LINER FOURTH TEN-YEAR ISI INSPECTION INTERVAL RELIEF REQUEST 3 (TAC No. MD9268)

FPL installed a reinforced vinyl ester liner on the bottom of the Unit 1 Refueling Water Tank (RWT) in 1994. The NRC approved the use of this liner as an alternative non-Code repair for the second and third ten-year ISI inspection intervals via approval of Relief Requests 13A, RR-07, and RR-7A. Relief Request 3 was submitted via Reference 1 to address the use of the installed RWT liner during the fourth ten-year ISI inspection interval.

The NRC staff has reviewed the information provided by FPL in Reference 1, and has determined that additional information is necessary to complete the review of the Relief Request. Four Request for Additional Information (RAI) questions (TAC No. MD9268) were provided by the NRC to FPL via Reference 2. These questions, and FPL's responses to these questions, are provided below.

NRC QUESTION NO. 1

It appears that the only tests and inspection ever done on this lining have been remote visual and hands on visual examinations. What measures have been taken to ensure that leakage has not occurred through the lining due to small defects in the liner? Has any type of electrical continuity test, to detect small defects in the coating, been performed to ensure that leakage from the tank has not occurred and possibly undermined the sand layer supporting the bottom of the tank?

FPL RESPONSE

Installation of the liner material was performed under the direction of FPL's Nuclear Coatings Specialist as a special process. As such, the liner was pre-engineered for use and installed via a controlled Engineering document for plant change/modifications. Special process controls included applicator certification and training, and QC hold point inspections for environmental conditions, surface preparation, mixing, and testing. The tank surface to which the liner was applied was sandblasted and visually inspected to confirm proper surface preparation. Up-front vendor testing of the material, post-installation testing of the installed liner, and additional post-installation testing and evaluation of the physical and chemical properties of the liner material, were performed to confirm the adequacy of the product for its intended use.

Testing of the liner material was performed during the installation in accordance with manufacturer's recommendations. In addition to visual inspection performed by the Nuclear Coatings Specialist, the installed liner was subjected to (a) millage testing to confirm required thickness, and (b) high-voltage spark testing to confirm the absence of holidays and pinholes.

Following the initial installation, FPL has utilized an NRC-approved inspection program consisting primarily of visual inspection. During the first refueling outage following the installation of the liner, the RWT was drained and a full hands-on inspection was performed. Subsequently, this hands-on inspection is performed every sixth refueling outage. The hands-on inspection is a visual inspection, enhanced as required by limited physical testing to evaluate specified properties of the liner (e.g., knife test for hardness and undercutting, sounding with a hammer to detect delamination and adhesion). During all operating cycles in which the hands-on inspection is not performed, a remote visual inspection (utilizing a camera on a remote-controlled submersible device) is performed. The original inspection schedule specified hands-on inspections every third outage. The satisfactory inspection data (i.e., no significant findings) allowed the interval between hands-on inspections to be extended to six outages; this was implemented via NRC review and approval of RR-7A. All visual inspections have been performed by FPL's Nuclear Coatings Specialist, who is a qualified coatings industry expert (Vice Chairman of ASTM Committee D33 on Protective Coating and Lining Work for Power Generation Facilities; Vice Chairman of EPRI Nuclear Utilities Coatings Council; Vice Chairman of BWROG Coatings; NACE technical advisor for International Coatings Inspection certification).

Visual inspection is the industry standard for detecting defects in coating material after initial installation. NRC has provided guidance for safety related coatings evaluations (Reference 3) which references an EPRI report (Reference 4) providing confirmatory support for coatings inspection methods that rely upon visual inspection as the primary acceptance methodology, augmented by appropriate physical testing when required. Physical testing, however, is typically destructive in nature, and should only be used to determine the size or cause of a detected defect. Reference 3 documents NRC review of Reference 4, and documents that it provides adequate supporting evidence that the containment coatings monitoring approach contained in ASTM D5163 (as implemented by licensees and endorsed by the NRC in Regulatory Guide 1.54 Rev. 1 and NUREG 1801, Volume 2, Appendix XI.S8) is valid.

The water level in the RWT is monitored by four Rosemount level transmitters. Unit 1 Technical Specification 4.5.4 requires that the RWT be demonstrated to be operable at least once every seven days (while in Modes 1-4) by verifying the water level in the tank. Although the Technical Specification action statement would not be entered until the tank volume becomes less than the minimum value (401,800 gallons of borated water), any continuous reduction in tank inventory would be noticed by Operations. This is the means by which the original RWT leak was discovered in 1993. A review of the condition report database has shown no evidence of such inventory loss. CR 2006-27997 (written to document that one of the RWT level indicators was alarming early) specifically noted that "a review of RWT level readings taken from September 28, 2006 to October 1, 2006 indicate no RWT inventory loss." Thus, there is no evidence of leakage from the Unit 1 RWT.

In summary, since the liner was installed as a special process, with special process inspections performed at the time of installation, use of visual hands-on inspections (the industry standard) in conjunction with remote visual inspections is an acceptable method of confirming the continued

acceptable condition of the liner.

NRC QUESTION NO. 2

Since the aluminum tank wall is a structural, load carrying element of the tank, what is the condition of the tank at the aluminum/liner interface? What is the condition of the tank wall under the liner?

FPL RESPONSE

The aluminum/liner interface is inspected every cycle. During the hands-on inspection (when the tank is drained), the interface is inspected visually; also, a knife test is used to ensure that there is no undercutting of the liner at the interface. During the remote visual inspections, an inspection of the interface around the entire circumference of the tank is specifically performed. No problems in this area have been identified.

No issues have been identified with the aluminum surface above the liner. This material was originally chosen because of its resistance and imperviousness to the chemical solution of the borated water contained within the tank. Thus, even if the borated water within the tank were to find a path to the region behind the liner, it would not adversely affect the condition of the aluminum.

The exterior of the RWT wall is inspected as part of the System and Component Engineering walkdown program. System walkdowns are performed on a quarterly basis. The RWT is included in System 07 (Containment Spray System). The walkdown reports for this system document inspections for leakage, evidence of corrosion, and surface condition (i.e., pits and gouges) of the RWT. The most recent walkdown report for this system (performed June 23, 2008, approved August 16, 2008) indicated acceptable inspection findings for all these criteria.

NRC QUESTION NO. 3

Does the manufacturer of the tank liner material have a projected lifetime for the liner in the specific medium that the liner can be exposed to and what is that lifetime? Based on operational experience with this liner material (in particular, experience with use of this liner material in environments similar to the St Lucie Unit 1 storage tank), what is the expected lifetime of this liner?

FPL RESPONSE

There is no specific projected service life for the tank liner provided by the liner manufacturer. This liner material is commonly used for extreme chemical conditions (i.e., an environment more severe than that in the Unit 1 RWT). The use of the liner in the RWT was based on the manufacturer's recommendation for use of this system for applications involving concentrated

acid spills, acid neutralization, and caustic handling areas. As documented in Reference 5, the vinyl ester material used for the liner has good to excellent chemical resistance to 10% solutions of acids, and excellent resistance to mineral acids such as boric acid. The Technical Specification required RWT concentration of 1720 ppm boric acid is much less than the 10% concentration evaluated above. Thus the conditions in the RWT are considered mild compared to the conditions for which the manufacturer recommends use of this liner material. The lack of a specific projected service life was recognized when the proposed inspection program was developed by FPL. The inspection program that has been used (and that is proposed for use during the fourth ten-year ISI inspection interval) is designed to detect any minor defects in the liner material prior to the failure of the liner. Thus, this program (in conjunction with the monitoring of the RWT level) will provide indications if the liner begins to approach the end of its effective service life. This methodology is consistent with industry standards and NRC-approved safety related coatings inspection programs.

NRC QUESTION NO. 4

In reference to the discolored areas on the liner discussed in Paragraph 5.1.1 and other places in the relief request, how has it been confirmed that this discoloration is not from oil or other fluids leaking into the tank from below that tank?

FPL RESPONSE

During the hands-on inspection (when the tank was drained), the areas of discoloration were examined by physical scraping of the surface to determine the source. The discoloration was determined to be a surface phenomenon, with no depth of penetration; there was no evidence that the source of the discoloration was coming into the tank from below the tank bottom through a leak in the tank liner material. During the remote visual inspections (when the tank was full of water), particulate matter and other minor debris was observed to have settled onto the tank bottom; this material appears to have been the source of discoloration observed.

References

1. FPL Letter L-2008-079, dated April 9, 2008 (Subj: Fourth Ten-Year Interval Unit 1 Relief Request 3).
2. E-mail from Brenda Mozafari (NRC) to Ken Frehafer (FPL), dated August 29, 2008.
3. "NRC Staff Review Guidance Regarding Generic Letter 2004-02 Closure in the Area of Coatings Evaluation," prepared by NRC Staff, Steam Generator Tube Integrity and Chemical Engineering Branch, Division of Component Integrity, Office of Nuclear Reactor Regulation, March 2008.
4. EPRI Report No. 1014883, July 2007.
5. FPL Letter L-2000-211, dated October 18, 2000 (Subj: Unit 1 Revised Relief Request 7A).