



10 CFR 50.90
L-2007-079
April 30, 2007

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
License Amendment Request No. 178: Spent Fuel Pool Boraflex Remedy
Response to NRC Request for Additional Information

By letter L-2005-247 dated January 27, 2006, Florida Power and Light Company (FPL) submitted a license amendment request to revise the Turkey Point Unit 3 and 4 Technical Specifications (TS). The proposed change eliminates the need to credit Boraflex™ neutron absorbing material for reactivity control in the spent fuel pools. Compensation for the absence of Boraflex™ is to be provided by improved analytical techniques, crediting the use of updated spent fuel storage patterns and also by installing Metamic™ rack inserts in certain storage rack locations.

By letters dated August 8, 2006 and October 24, 2006, Nuclear Regulatory Commission (NRC) staff issued requests for additional information (RAI) to support their review of this license amendment request. FPL's response to these requests was provided in our letter L-2006-259 dated November 28, 2006

Subsequently, the NRC Staff has identified a need for additional details and clarification of the proposed surveillance program for the Metamic rack inserts, as identified in their letter dated April 11, 2007. Attached is the FPL reply to the April 11, 2007 RAI. The original No Significant Hazards Consideration Determination remains valid considering the information provided herein and no revision of the requested TS changes is involved.

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

Florida Power & Light Company
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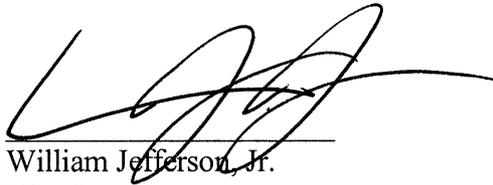
Should there be any questions concerning the information contained herein, please contact James Connolly at (305) 246-6632.

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

Very truly yours,

4/30/07

Executed on



William Jefferson, Jr.
Vice President
Turkey Point Nuclear Plant

Attachment: Response to NRC RAI dated April 11, 2007

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point
W. A. Passetti, Florida Department of Health

RESPONSE TO
A SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION RELATED TO
LICENSE AMENDMENT REQUEST FOR SPENT FUEL POOL BORAFLEX REMEDY
FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT NUCLEAR PLANT, UNITS 3 AND 4
DOCKET NOS. 50-250 AND 50-251

By letter dated January 27, 2006 (ML060900250), Florida Power and Light Company (FPL) submitted to the Nuclear Regulatory Commission (NRC) a request for review and approval of an amendment to the Turkey Point Unit 3 Operating License (DPR-31) and Turkey Point Unit 4 Operating License (DPR-41). The proposed amendments would revise Technical Specification Section 3/4.9.1 - Boron Concentration, 3/4.9.14 - Spent Fuel Storage, and 5.5.1 - Criticality, to include new spent fuel storage patterns and credit the use of Metamic™ rack inserts. A request for additional information (RAI) dated August 8, 2006 (ML062180074), was issued by the NRC. The NRC staff subsequently identified a need for more information that was not included in the August 8, 2006 RAI and issued an RAI on October 24, 2006. FPL provided its response to both the original and supplemental RAI as attachments to letter L-2006-259 on November 28, 2006.

Following the review of FPL responses, NRC staff determined they had additional questions and that further clarification of certain FPL proposed actions was required. A total of nine additional questions were received from the NRC in a letter dated April 11, 2007. This letter is FPL's response to the NRC questions of April 11, 2007. Below, each question posed by the NRC is restated, followed by the FPL response.

The nature of these additional questions, and related discussions with NRC staff, have prompted FPL to modify the Metamic™ insert surveillance program originally proposed in the license amendment request and elaborated upon in FPL letter L-2006-259 dated November 28, 2006. The modified surveillance program described (in part) herein addresses NRC concerns relative to monitoring the performance of a material used in a new application i.e., Metamic™. In instances where aspects of the insert surveillance program described below differ from that previously submitted, the information provided within this response supersedes prior transmittals.

NRC Request:

1. On Page 2 of 10 of the November 28, 2006, supplemental submittal, you provided the selection criteria for the inserts that will be inspected at each surveillance. In addition, you stated that a minimum of five inserts will be inspected during each surveillance per spent fuel pool (SFP). Given that you have requested approval for welded, formed, and welded and formed Metamic™ inserts, the different types of inserts in the SFPs should be included as insert selection criteria. For example, if all three types of inserts are installed in the SFPs, at least one of each insert type should be included in the five inserts being inspected each surveillance per SFP. Discuss your plans to include this insert selection criteria to your surveillance program.

FPL Response:

FPL intends to select inserts for surveillance activities from only the lead unit (i.e., the Turkey Point unit in which Metamic™ inserts are first installed). FPL will select a variety of inserts from the lead unit for inclusion in each in-service inspection campaign. If, for example, inserts fabricated primarily by welding are installed in the fuel pool along with inserts fabricated through a forming process, then surveillance inspections will examine at least one insert produced by each technique.

NRC Request:

2. Prior to the installation of the Metamic™ inserts, you indicated that an insert receipt inspection will be performed on page 5 of 8 of the November 28, 2006, supplemental submittal. Discuss the inspections that will be performed during this receipt inspection.

FPL Response:

A receipt inspection of Metamic™ inserts will be performed at the Turkey Point site. The primary purpose of this receipt inspection is to verify inserts have arrived from the fabrication facility without being damaged en-route and to ensure that inserts will be properly stored in the site warehouse prior to installation. As such, receipt inspection will focus on assessing the condition of as-received packaging material; it will verify that inserts were packaged at the factory and shipped to the site in accordance with requirements of the purchase order (PO). Deviations from PO requirements or evident damage to shipping materials will prompt a thorough investigation of the condition of each potentially affected insert, leading to a possible rejection of the shipment, thereby returning it to the fabricator for disposition of non-conformance.

Prior to final installation in the fuel pool an abbreviated inspection of each insert will be performed, focusing on cleanliness, features that interface with handling tools, and panel straightness.

NRC Request:

3. As a verification of your visual examinations, you are planning to perform dimensional (length, width, and thickness) and weight measurements at 8 and 20 years on at least one insert per SFP, as indicated on page 7 of 8 of the November 28, 2006, supplemental submittal. Given that this is a new material and your request is for a new application, more frequent verification seems appropriate. For example, dimensional and weight measurements could be performed at 4, 12, 20, and 30 years. Discuss your plans to include more frequent verification inspections in the surveillance program and justify the proposed frequency.

FPL Response:

Visual surveillance of a sample of Metamic™ panels taken from the lead Turkey Point unit will be performed at 4, 8, 12, 20 and 30 years after installation, or for as long as Metamic™ is credited to control neutron multiplication in either Turkey Point spent fuel pool. These surveillance campaigns will examine Metamic™ base metal, welds (including the adjacent heat affected zones), mechanical attachments and bend area, including interior and exterior bend radii (if applicable), considering the criteria described in Attachment 1 of FPL's November 28, 2006, submittal. Additionally, FPL proposes to perform insert validation measurements on at least two inserts installed at the lead unit after 4, 12, 20 and 30 years, again for as long as Metamic™ is credited to control neutron multiplication at either Turkey Point unit. As noted in Attachment 2 of the same November 28, 2006 submittal (see FPL's response to Item 3e), measurements will be made on, and acceptance criteria established for, Metamic™ panel length, width, panel thickness, and weight. Values obtained from these validation campaigns will be compared to those from design drawings.

NRC Request:

4. Given that the performance of Metamic™ is dependent on its neutron attenuation, it is necessary that a licensee demonstrate that the material's neutron attenuation properties are adequate. Discuss your plans to incorporate neutron attenuation testing into your surveillance program. Neutron attenuation could be incorporated into the surveillance program in two ways: (1) neutron attenuation testing of active inserts could be performed at 4, 12, and 20 years, or (2) sacrificial inserts could be appointed to be removed from service and replaced with new inserts at 4, 12, and 20 years for neutron attenuation testing. Provide the justification for the proposed frequency. In addition, provide the insert selection criteria for those inserts to be tested for their neutron absorption. Also, your surveillance program should address the acceptance criteria and corrective actions for when an insert fails neutron attenuation testing.

FPL Response:

Neutron attenuation testing will be performed on samples of Metamic™, configured as a coupon tree and placed in a representative rack location in the lead unit's fuel pool. This coupon tree will be added to the fuel pool as part of the initial Metamic™ insert installation campaign. Coupons from the tree will be retrieved and subjected to neutron attenuation testing at 4, 12, 20, and 30 years after installation, or for as long as Metamic™ is credited to control neutron multiplication in either Turkey Point spent fuel pool. Initially, the coupon tree will contain at least 10 pre-characterized samples; permitting two coupons to be removed at each interval, with two or more coupons held in reserve. Coupons will be fabricated from the same alloy 6061 aluminum and boron carbide powder batches as are used to form the Metamic™ panels. Typically, coupons will be made from the excess material removed while sizing the panels for fabrication (e.g. during a post-rolling shearing process). As such, coupons are clearly representative of the Metamic material used to fabricate inserts. Coupons are only intended for the assessment of neutron absorption characteristics (i.e., boron depletion). Therefore, fabrication techniques such as welding and forming will not be simulated in the coupons. The behavior of these other fabricated features (e.g., panel welding and forming) will be examined as part of the visual surveillance program. Therefore, coupons may not be identical to the welded or formed shapes. At present, FPL does not plan to return any of the samples to the coupon tree after attenuation testing.

An initial test interval of four years is judged adequate for validating neutron attenuation in this application, based on pre-service material characterization performed as part of the manufacturing process, and the homogenous, essentially fully-dense nature of the Metamic™ material. Results of prior testing performed by EPRI and Holtec, and the complementary visual surveillance and validation measurement programs being undertaken at Turkey Point provide

reasonable assurance that no unforeseen depletion of absorber material will occur in the intervals prior to attenuation testing.

As proposed here, neutron attenuation testing is intended to validate FPL's earlier assumptions concerning the absorber material areal density (expressed as grams of boron-10/cm²) present in Turkey Point spent fuel rack inserts, made as part of an updated fuel pool criticality analysis. So long as attenuation measurements yield B-10 areal density values greater than those assumed in the prior analyses, acceptance criteria are met.

FPL's Corrective Action Program will be used to develop, document and prioritize remedial actions for anomalous conditions identified during the surveillance program.

NRC Request:

5. You have indicated the acceptance criteria and corrective actions for the visual inspections and the dimensional and weight measurements. Ultimately, the insert will be removed from service and replaced. In addition, you indicated that diagnostic dimensional and weight measurements will be performed on failed inserts. Describe your plans to include diagnostic neutron attenuation testing when an insert fails the acceptance criteria.

FPL Response:

As noted in response to Question 4, the operability criterion relevant to Metamic™ panels from a neutron attenuation standpoint is that values of B-10 areal density must conform to criticality analysis assumptions. Thus, diagnostic attenuation testing will not be performed on inserts if coupon-based surveillance demonstrates adequate B-10 areal density.

As further clarification of a point noted in Question 5, while it is correct to conclude that installed inserts failing to meet acceptance criteria will be removed from service, FPL does not foresee wholesale replacement of installed Metamic™ inserts in either Turkey Point fuel pool, absent new evidence constraining panel lifetime or evidence indicating an in-situ common-mode failure. Prior testing performed on Metamic™ material provides reasonable assurance that once installed, inserts will remain functional for as long as needed to control neutron multiplication in the array of stored fuel.

Should an insert fail to meet any of the visually-based acceptance criteria, the initial sample of five inserts will be doubled, to a total of ten inserts, to aid in establishing the extent of condition. Similarly, should an insert fail to meet any validation-based acceptance criteria (i.e., dimensional

or weight) the initial sample of two inserts will be doubled, to a total of four inserts, also to establish the extent of condition. Absent evidence to the contrary, the out of specification condition would be assumed to be present at each Turkey Point unit. Irrespective of the number of inserts involved, this failure to meet acceptance criteria would be identified and addressed as an issue within FPL's Corrective Action (CA) Program, where the goal would be to develop an understanding of the failure mechanism and its cause. FPL's CA program also requires that analysis of the type of failure posed here consider generic implications (i.e., implications for insert functionality at the "non-lead" unit). As directed by FPL's CA program, follow-on examinations or validation of Metamic™ inserts at the "non-lead" unit may be performed to validate assumptions and conclusions regarding the extent of condition. At a minimum, examination or validation measurements would be required to exempt the "non-lead" unit from issues observed in the lead unit. While these activities, and any required compensatory measures, are underway, each spent fuel pool will be maintained with at least 1950 ppm soluble boron, which ensures that sub-critical conditions are maintained.

NRC Request:

6. Given that Metamic™ is a new material and your request is for a new application, we request that you submit the results of each surveillance to the NRC staff. The reporting requirements should be addressed in your surveillance program. The reporting requirements should include the results of the baseline inspection and all subsequent inspections (i.e., visual, length, width, thickness, weight, and neutron absorption). Discuss how soon after completion of each surveillance this report will be submitted.

FPL Response:

FPL will document the result of each in-service surveillance campaign performed on Metamic™ inserts at Turkey Point. Results of any diagnostic measurement campaigns performed to assess anomalous conditions found after installation will also be documented. A summary-level report of results for each campaign will be provided to the NRC staff within six months after completing the campaign. This report will include, as applicable, updates on results from prior inspections of Metamic™ inserts used at Turkey Point.

NRC Request:

7. You indicated that two coupons will be neutron attenuation tested during Surveillance Periods 4, 12, 20 and 30 for the "lead unit". Please discuss how many coupons will be placed in the SFP of the "lead unit". The need for additional coupons should be taken into consideration if coupons fail the neutron attenuation test. In addition, state whether the two coupons that are neutron attenuation tested during each surveillance will be returned to the SFP. If not, please justify.

FPL Response:

As noted in response to Question 4, FPL plans to add at least 10 coupons to the lead unit's fuel pool; two coupons for each planned attenuation test, with two or more coupons reserved as spares. FPL has no plans to re-install in the coupon tree material samples retrieved earlier for neutron attenuation testing, as an adequate number of coupons will be initially installed to address testing requirements. Tested coupons may not continue to be representative of installed full-length Metamic™ inserts if re-inserted after undergoing decontamination, drying and attenuation testing.

NRC Request:

8. Provide the acceptance criteria for the neutron attenuation tests and the actions to be taken when the acceptance criteria are not met for the "lead unit". Include a discussion of when surveillance may be performed in the "other unit". The operating history of both units should also be considered in the acceptance criteria.

FPL Response:

The acceptance criteria used during neutron attenuation testing of Metamic™ coupons will be based on criticality analysis assumptions of the boron-10 areal density present in the Metamic™ material, taking into account any uncertainty in testing results. Significant decreases in areal density from the as-fabricated specification, noted as a result of neutron attenuation testing, will be quantified and evaluated, as Metamic™ panels are not expected to experience appreciable boron depletion in a fuel pool environment.

Should neutron attenuation test results for coupons from the lead unit fail to meet acceptance criteria, the ramifications will apply equally to both spent fuel pools. Note that each Turkey Point spent fuel pool is maintained with a soluble boron concentration greater than 1950 ppm, at all times, consistent with Technical Specification requirements. The presence of this soluble

boron ensures that sub-critical conditions are maintained. In the event Metamic coupons fail to meet areal density-based acceptance criteria, detailed analyses would be performed to determine the cause and to understand the boron depletion mechanism. Metamic™ inserts from the “other unit” will be examined as part of this failure analysis to ensure a full understanding of causal mechanisms.

NRC Request:

9. You indicated that you plan to perform the proposed surveillance on the “lead unit”. The “lead unit” will be the unit that has Metamic™ inserts first placed in the SFP. You stated that the operating conditions for the inserts will essentially be identical. Given that differing operating conditions, fuel types, and fuel burnup can be introduced to either unit, discuss how you intend to evaluate the functionality of the inserts in the “other unit”.

FPL Response:

Assessment of the functionality of Metamic™ inserts at the “other unit” will directly follow from the measurements made and assessments of insert functionality for the “lead unit”. This means that any conclusions formed about Metamic™ inserts based on examinations performed at the “lead unit” will be applied to inserts installed in the “other unit”, absent clear evidence to the contrary. This is reasonable because the two Turkey Point spent fuel pools are identical (mirrored) with virtually identical cooling, rack design and support systems. Identical fuel types are used at each Turkey Point unit; the resulting burnup limits are controlled via a single set of plant Technical Specifications, and supported by a single set of analyses. Analyses justifying use of Metamic™ inserts were based on the limiting fuel type, enrichment and burnup, considering all fuel present in both units. Operationally, both spent fuel pools are maintained in an identical manner to equivalent limits. The only noteworthy difference is that the two spent fuel pools may at times contain different numbers of irradiated fuel assemblies. Considering all of these factors, surveillance and validation measurement programs in the lead plant will well represent both Turkey Point spent fuel pools. Therefore, at the surveillance intervals noted earlier, visual examination of a representative sample of inserts from the lead unit will be performed, with insert selection based on the potential for adverse impact. Further, validation measurements will be performed on two or more Metamic™ inserts extracted from the lead unit, at 4, 12, 20 and 30 years after initial installation.

Should an insert fail to meet any of the visually-based acceptance criteria, the initial sample of five inserts will be doubled, to a total of ten inserts, to aid in establishing the extent of condition. Similarly, in the event an insert fails to meet any of the validation-based acceptance criteria (i.e.,

dimensional or weight) the initial two-insert sample will be doubled, to a total of four inserts, to aid in establishing the extent of condition. Absent evidence to the contrary, the out of specification condition would be assumed present at each Turkey Point unit. Irrespective of the number of inserts involved, a failure to meet acceptance criteria would be identified and addressed as an issue within FPL's CA Program, where the goal would be to develop an understanding of the failure mechanism and its cause. FPL's CA program also requires that analysis of the type of failure posed here consider generic implications (i.e., implications for insert functionality at the "non-lead" unit). As directed by the CA program, follow-on examinations or validation of Metamic™ inserts at the "non-lead" unit may be performed to check assumptions and conclusions regarding the extent of condition. At a minimum, examination or validation measurements would be required to exempt the "non-lead" unit from conclusions applicable to the lead unit. As noted in an earlier response, while these activities and any required compensatory measures are underway, each spent fuel pool is maintained with at least 1950 ppm soluble boron, which ensures that each fuel pool remains sub-critical at all times.