



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

March 11, 2010

EA-10-037

Mr. Mano Nazar
Executive Vice President
Nuclear and Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

**SUBJECT: TURKEY POINT NUCLEAR PLANT - NRC INSPECTION REPORT
05000250/2010008; PRELIMINARY GREATER THAN GREEN FINDING
AND POTENTIAL ESCALATED ENFORCEMENT VIOLATION**

Dear Mr. Nazar:

On March 5, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an in office review of Turkey Unit 3 Boraflex degradation issues to determine the significance of Turkey Point Unit 3 Boraflex issues identified in the NRC Inspection Report Nos. 05000250, 251/2009-005. The enclosed report documents the inspection findings, which were discussed on March 11, 2010, with Mr. Michael Kiley of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of our review, the inspectors identified a total of 5 Apparent Violations (AVs) associated with degradation of the Turkey Point Unit 3 spent fuel pool (SFP) storage racks. Two AVs associated with a single preliminary greater than Green finding were evaluated in accordance with the NRC's Reactor Oversight Program Significance Determination Process and three other AVs were evaluated using the NRC's traditional enforcement process.

The preliminary greater than Green finding is related to Florida Power and Light's (FPL) failure to properly manage known spent fuel pool degradation resulting in two Apparent Violations (AVs). The two AVs involved (1) the failure to comply with Technical Specifications and 10 CFR 50.68(b)(4) requirements to assure that the effective neutron multiplication factor (K_{eff}) would be maintained less than 1.0, for all cases in the Unit 3 spent fuel pool (SFP) when flooded with unborated water, and (2) the failure to implement effective corrective actions as required by 10 CFR 50, Appendix B, Criterion XVI, for the degradation of Boraflex neutron absorber material in the Unit 3 SFP, such that in November 2009, two spent fuel pool storage cells with Boraflex degradation beyond the assumptions in the pool criticality analyses were identified that had been allowed to remain in service even after the licensee established revised SFP management controls.

This ROP finding was assessed based on the best available information, using the Significance Determination Process (SDP). Preliminarily, we consider this NRC-identified finding having greater than very low safety significance based on a qualitative review using Inspection Manual Chapter (IMC) 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria."

The degradation of the fixed neutron absorber resulted in a significant loss of one of the two barriers preventing criticality in the SFP. Although this condition did not lead to a criticality, it did present an immediate safety concern, and your staff implemented compensatory measures to ensure that the SFP remained subcritical. The NRC acknowledged the compensatory measures in Confirmatory Action Letter (CAL) RII-10-002 on December 19, 2009. The two AVs of NRC requirements associated with this finding are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy can be found on the NRC's Web site at <http://www.nrc.gov/reading-rm/doc-collections/enforcement>.

In accordance with IMC 0609, we intend to complete our evaluation using the best available information and issue our final determination of safety significance within 90 days of the initial notification. The SDP encourages an open dialogue between the staff and the licensee; however, the dialogue should not impact the timeliness of the staff's final determination. Before the NRC makes its enforcement decision, we are providing you an opportunity to either: (1) present to the NRC your perspectives on the facts and assumptions used by the NRC to arrive at the finding and its significance at a Regulatory Conference, or (2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least 1 week prior to the conference in an effort to make the conference more efficient and effective. If a conference is held, it will be open for public observation. The NRC will also issue a press release to announce the conference. If you decide to submit only a written response, such a submittal should be sent to the NRC within 30 days of the receipt of this letter. If you decline to request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination; in that, by not doing either you fail to meet the appeal requirements stated in the Prerequisite and Limitation Sections of Attachment 2 of IMC 0609.

The report also documents three AVs related to (1) the licensee's failure to make notification to the NRC in accordance with the requirements of 10 CFR 50.73 when testing of Boraflex panels in the Unit 3 SFP revealed degradation beyond minimum design values specified in the Updated Final Safety Analysis Report (UFSAR); (2) failure to comply with 10 CFR 50.59, which requires that licensees maintain records that include a written evaluation which provides the bases for the determination that a change, test, or experiment does not require a license amendment; and (3) the failure to update the FSAR in accordance with 10 CFR 50.71(e) so that the report accurately reflects significant changes made to the facility. These AVs are being evaluated using the NRC's traditional enforcement process and are also being considered for escalated enforcement action in accordance with the NRC Enforcement Policy because they impacted the NRC's ability to perform its regulatory function.

Before the NRC makes its enforcement decision on the three AVs evaluated via traditional enforcement, we are providing you an opportunity to either: (1) respond to the three apparent violations within 30 days of the date of this letter or (2) request a Predecisional Enforcement

Conference (PEC). If a PEC is held, it will be open to public observation in accordance with the NRC Enforcement Policy.

If you choose to provide a written response, it should be clearly marked as a "Response to Apparent Violation, EA-10-037," and should include: (1) the reason for the apparent violations, or, if contested, the basis for disputing the apparent violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision. Because this issue does not involve security-related information, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

In recognition of the relationship of these 5 AVs, the commonality of any likely corrective actions to preclude recurrence, and to minimize administrative and resource burden, we encourage you to consider requesting a joint Regulatory Conference/PEC to discuss the above matters, or as an alternative, you may include your response to these issues and corrective actions in a single written response.

Please contact Marvin Sykes at (404) 562-4629 within 10 days of the date of this letter to notify the NRC of your intended response. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. You will be advised by a separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for these inspection findings at this time. Please be advised that the number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA by Joel T. Munday Acting For/

Leonard D. Wert, Jr., Director
Division of Reactor Projects

Enclosure: Inspection Report 05000250/2010008;
w/Attachment: Supplemental Information

cc w/encl: (See page 4)

Conference (PEC). If a PEC is held, it will be open to public observation in accordance with the NRC Enforcement Policy.

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In recognition of the relationship of Turkey Point Unit 3 Boraflex degradation issues, the commonality of any likely corrective actions to preclude recurrence, and to minimize administrative and resource burden, we encourage you to consider requesting a joint Regulatory Conference/PEC to discuss the above matters, or as an alternative, you may include your response to these issues and corrective actions in a single written response.

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Sincerely,

/RA by Joel T. Munday Acting For/

Leonard D. Wert, Jr., Director
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cc w/encl: (See page 4)

X PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE X NON-SENSITIVE
ADAMS: X Yes ACCESSION NUMBER: ML100700661 X SUNSI REVIEW COMPLETE

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:EICS	RII:DRP		HQ/NRR
SIGNATURE	/RA/	/RA/	SMS by email	SES by telecon	JTM for		MAB by email
NAME	SNinh	MSykes	SStewart	SSparks	LWert		MAshley
DATE	03/10/2010	03/10/2010	03/11/2010	03/11/2010	03/11/2010		03/11/2010
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO		YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: I:\RPB3\TURKEY POINT\TURKEY POINT SPENT FUEL POOL ISSUE\TURKEY POINT UNIT 3 SFP CHOICE LETTER 2010-008-FINAL.DOC

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Letter to Mano Nazar from Leonard D. Wert, Jr., dated March 11, 2010

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AND POTENTIAL ESCALATED ENFORCEMENT VIOLATION

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OE Mail

RIDSNNRRDIRS

PUBLIC

RidsNrrPMTurkeyPoint Resource

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-250

License No.: DPR-31

Report No: 05000250/2010008

Licensee: Florida Power & Light Company (FPL)

Facility: Turkey Point Nuclear Plant, Units 3 & 4

Location: 9760 S. W. 344th Street
Florida City, FL 33035

Dates: February 14 to March 5, 2010

Inspectors: J. Stewart, Senior Resident Inspector
M. Barillas, Resident Inspector
S. Ninh, Senior Project Engineer
P. Higgins, Project Engineer

Approved by: M. Sykes, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000250/2010008; 02/14/2010 – 03/05/2010; Turkey Point Unit 3; Problem Identification and Resolution

This report covers an inspection by the resident inspectors and Region II project engineers of degradation of Boraflex, a fixed neutron absorber used in the Unit 3 spent fuel pool (SFP). The inspectors identified a preliminary greater than Green finding with two Apparent Violations (AVs) and three AVs with potential for escalated enforcement action. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Cross-cutting aspects were determined using IMC 0305, "Operating Reactor Assessment Program." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

TBD. The inspectors identified an AV of Technical Specification 5.5.1.1.a and 10 CFR 50.68(b)(4) for failure to assure that the effective neutron multiplication factor (K_{eff}) would be maintained equivalent to less than 1.0, for all cases in the Unit 3 spent fuel pool (SFP) when flooded with unborated water.

The finding was more than minor because, if left uncorrected, the racks would continue to degrade further reducing the neutron absorption capability and become a more significant safety concern. In addition, the finding impacted the initiating event cornerstone objective of limiting events that challenge safety functions; for example, preventing criticality in an area not designed for criticality. Because probabilistic risk assessment tools were not suited for this finding, the inspectors evaluated the finding using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." Because the Boraflex degradation resulted in a significant loss of margin to criticality, NRC management concluded the finding was preliminarily greater than Green. The inspectors determined that the cross-cutting aspect of Problem Identification and Resolution, (P.1(c)) is applicable to this issue because the licensee did not properly evaluate the problems associated with Boraflex degradation to assure operability and reportability was adequately addressed. (4OA2)

TBD The inspectors identified an AV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failure to effectively correct a condition adverse to quality involving degradation of Boraflex neutron absorber material in the Unit 3 SFP, such that in November 2009 two spent fuel pool storage cells [L38, F19] with Boraflex degradation greater than that assumed in the criticality analyses had been allowed to remain in service even after the licensee had revised SFP management controls. When brought to the attention of the licensee by the NRC, condition report 2009-34470 was written to document the non-compliance.

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The finding was more than minor because, if left uncorrected, it would become a more significant safety concern since it could not be determined if other, untested storage rack locations could be more degraded. In addition, the finding impacted the initiating event cornerstone objective of limiting events that challenge safety functions; for example, preventing criticality in an area not designed for criticality. Because probabilistic risk assessment tools were not suited for this finding, the inspectors evaluated the finding using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." Because the Boraflex degradation resulted in a significant loss of margin to criticality, NRC management concluded the finding was preliminarily greater than Green. The inspectors determined that the cross-cutting aspect of Problem Identification and Resolution (P.1(d)) is applicable to this issue because the licensee did not implement effective corrective action for degradation of Boraflex neutron absorber material. (4OA2)

Cornerstone: Not Applicable

TBD: The inspectors identified an AV of 10 CFR 50.73(a)(2)(B), when a condition prohibited by Technical Specifications was not reported to the NRC after testing of Boraflex panels in 2004 in the Unit 3 spent fuel pool revealed degradation greater than assumed in criticality analyses. Because the FPL program for determining degradation of cells was a sampling program, the state of other cells could not be determined. When identified to the licensee by the NRC, condition report 2010-6254 was written to evaluate and report the non-compliance with Technical Specifications to the NRC.

The finding was more than minor because it impacted the NRC's regulatory process, which relies on certain plant conditions being properly reported to the NRC. Because this finding impacted the regulatory process, it was evaluated using traditional enforcement and is being considered for escalated enforcement action in accordance with NRC's Enforcement Policy. No cross-cutting aspect associated with this issue was identified. (4OA2)

TBD: The inspectors identified an AV of 10 CFR 50.71(e) for failure to update the Final Safety Analysis Report (FSAR) so that the report accurately reflects significant changes made to the facility. As of December 2009, changes made to manage the Unit 3 spent fuel pool since 2001, including the use of alternate means of assuring that the spent fuel remains shutdown such as use of rod control cluster assembly inserts and water holes, use of neutron attenuation testing methods and results, and use of computer programs such as RACKLIFE, were not described in the Updated FSAR. When identified to the licensee by the inspectors, the licensee documented the condition in condition report 2009-34470, and informed the NRC (in letter L-2009-295, dated December 31, 2009) of plans to make appropriate updates to the FSAR descriptions by March 15, 2010.

The finding was more than minor because it impacted the regulatory process, which relies on licensee's properly maintaining their FSAR up to date. Because this finding impacted the regulatory process, it was evaluated using traditional enforcement and is being considered for escalated enforcement action in accordance with NRC's Enforcement Policy. No cross-cutting aspect associated with this issue was identified. (4OA2)

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TBD: The inspectors identified an AV of 10 CFR 50.59(d)(1) for failure to maintain records that include a written evaluation which provides the bases for the determination that a change, test, or experiment does not require a license amendment. Specifically, the licensee received NRC approval to make changes to the facility via license amendment No. 234 dated July 17, 2007, involving the design of the spent fuel pool storage racks, including the use of Metamic inserts and other hardware, administrative controls and testing methods, to assure that the spent fuel remains within design limits. Subsequent to the NRC's approval, the licensee determined that Metamic inserts could not be installed by the date approved by the NRC. However, the licensee maintained no written evaluation which provided the bases for the determination that the change to the design of the spent fuel pool storage racks, without the use of Metamic inserts, did not require a license amendment pursuant to paragraph (c)(2) of 10 CFR 50.59.

The finding was more than minor because it impacted the regulatory process which depends on plant activities being properly evaluated and, when required, reviewed and approved by NRC. Because this finding impacted the regulatory process, it was evaluated using traditional enforcement and is being considered for escalated enforcement action in accordance with NRC's Enforcement Policy. The inspectors determined that the cross-cutting aspect of Human Performance, (H.4(c)) is applicable to this issue because the licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported, when errors in administering Technical Specification requirements and programmatic controls which assure safety were not effectively implemented. (4OA2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

Degradation of Boraflex in the Turkey Point Unit 3 Spent Fuel Pool (SFP)

a. Inspection Scope

The inspectors performed additional in-office review of Turkey Point Unit 3 SFP fixed neutron absorber (Boraflex) degradation issues and reviewed Apparent Violations (AVs) identified in Turkey Point Inspection Report Nos. 05000250, 251/2009005. The inspectors completed evaluations of Turkey Point Unit 3 Boraflex degradation issues using NRC Inspection Manual Chapter (IMC) 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," and the NRC Enforcement Policy.

b. Findings

- .1 The inspectors identified a preliminary greater than Green finding related to the licensee's failure to properly manage known spent fuel pool degradation resulting in two AVs.

Introduction:

(TBD) The inspectors identified an AV of Technical Specification 5.5.1.1.a and 10 CFR 50.68(b)(4) for failure to assure that the effective neutron multiplication factor (K_{eff}) would be maintained less than 1.0 for all cases in the Unit 3 SFP when flooded with unborated water.

(TBD) The inspectors identified an AV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for failure to effectively correct degradation of Boraflex neutron absorber material in the Unit 3 SFP such that in November 2009 two spent fuel pool storage cells were identified with Boraflex degradation greater than that assumed in the criticality analyses that had been allowed to remain in service, even after the licensee had revised the SFP management controls. When brought to the attention of the licensee by the NRC, condition report 2009-34470 was written to document the non-compliance.

Description:

Turkey Point Technical Specification Bases, 3/4.9.14, states that the spent fuel storage racks provide safe subcritical storage of fuel assemblies by providing sufficient poison to assure (a) $K_{eff} < 0.95$ with a minimum soluble boron concentration of 650 PPM present, and (b) $K_{eff} < 1.0$ when flooded with unborated water for normal operations and postulated accidents. Further, Technical Specification 5.5.1.1.a states that the spent fuel pool shall be maintained with K_{eff} equivalent to less than 1.0 when flooded with unborated water, which includes a conservative allowance for uncertainties.

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In Generic Letter 96-04, issued on June 26, 1996, the NRC informed licensees that the fuel storage rack poison, Boraflex, could degrade beyond design allowable limits affecting the ability of the poison to assure subcriticality of stored fuel. FPL initiated a program to monitor Boraflex degradation in the Unit 3 spent fuel pool. Degradation of Boraflex in the Unit 3 spent fuel pool had been observed by FPL as dissolved silica in the pool water. Neutron attenuation (BADGER) testing conducted by the licensee revealed degradation rates in Boraflex panels greater than predicted. Since 2001 FPL had found degradation of Boraflex panels greater than assumed in safety reviews for the spent fuel pool and had incrementally taken steps to assure the subcritical storage of fuel, including administratively requiring water holes first as 1/4 pattern, then 2/4 checkerboard pattern in the region of the spent fuel pool suspected to have the highest level of degradation. Also, rod cluster control assemblies (RCCAs) were placed in stored fuel to maintain subcritical margins, and other administrative limitations were placed on storage of fuel in many of the areas of the pool most susceptible to Boraflex loss. Throughout this time, FPL did not update the Final Safety Analysis Report (FSAR) to describe the activities related to fuel storage in the pools, instead considering the Boraflex degradation to be a degraded condition that would be remedied.

A 2007 FPL analysis of fuel storage in the Unit 3 spent fuel pool, PTN-ENG-SEFJ-07-018, Rev. 0, concluded that a Boraflex remedy would be required by February 15, 2008, to assure subcritical conditions were maintained in the SFPs. On January 27, 2006, FPL submitted a Boraflex remedies license amendment request to the NRC, which was approved and issued on July 17, 2007. However, as of the time of this inspection, that amendment has not been implemented.

As noted in CR 2001-0234, the results of Boraflex testing indicate that the panels in Region II of the spent fuel pool have experienced non-uniform degradation that may be beyond that assumed in criticality analyses. Subsequent testing in 2004 revealed one Boraflex panel (R19 East) that exceeded the -50% level described in the UFSAR (-31.56% predicted by RACKLIFE versus -62.5% observed). The testing program was a sampling program that was used to infer conditions throughout the pool. Testing in 2007 revealed another panel with greater than 50% degradation (L38, -55.90%). This cell remained in service without administrative controls. Another cell (F19) had two panels that were projected to exceed 50% boron loss by August 2009 and although a Boraflex remedy should have been prescribed, due to an administrative error, the cell remained in service without a Boraflex remedy until November 2009. Licensee procedure 0-ADM-556, Fuel Assembly and Insert Shuffles, Step 3.1.4, requires that the FPL Nuclear Fuel Department determine storage cells that exceed panel Boraflex loss criteria and the dates that the cells are prohibited from use without an approved Boraflex remedy. In both cases, (L38 and F19), licensee calculations showed margin to criticality in a postulated boron dilution event. The NRC considered the licensee's inability to effectively implement adequate administrative controls, when specified, to be a concern which if left uncorrected could result in a potentially greater problem if an actual boron dilution event occurred.

The Turkey Point spent fuel pools are exterior to containment and there were no criticality monitors in the vicinity of the pools (licensees shall comply with requirements specified in 10 CFR 50.68 in lieu of maintaining a criticality monitoring system as

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described in 10 CFR 70.24). The licensee did not have procedures to mitigate an inadvertent criticality in the spent fuel pool. The licensee also stated that additional measures would be required to assure subcriticality should a full core offload of Unit 3 be required.

Analysis:

After identification of SFP storage rack Boraflex degradation beyond that assumed in the spent fuel criticality analysis, the licensee failed to properly manage known SFP Boraflex degradation resulting in two apparent violations: (1) Technical Specification 5.5.1.1.a and 10 CFR Part 50.68(b)(4) requirements for fuel storage in the Unit 3 SFP, and (2) failure to take corrective actions as required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," to resolve a condition adverse to quality involving Boraflex degradation. It is also important to note that although no inadvertent criticality event occurred, the licensee did not have installed equipment for criticality monitoring (in lieu of complying with other requirements of 10 CFR 50.68) and no approved procedures to mitigate the consequences of an SFP criticality.

The inspectors determined that the finding did not have an actual safety consequence, did not impact the NRC's ability to perform its regulatory function, and did not include any willful aspects. Therefore, the inspectors concluded that the finding did not require use of the traditional enforcement process. The inspectors concluded the findings were more than minor for the following reasons:

- 1) If left uncorrected, the racks would continue to degrade. The degradation would further reduce the neutron absorption capability and become a more significant safety concern.
- 2) The findings are associated with the increase in the likelihood of an initiating event (i.e. criticality in the SFP).

Phase 1 of the NRC's Significance Determination Process (SDP) does not address SFP criticality issues. Since probabilistic risk assessment tools and existing SDP guidance did not address SFP criticality issues, the inspectors reviewed the issue using NRC IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." The completed Appendix M evaluation is attached.

While evaluating the significance of the condition, the inspectors concluded an actual inadvertent criticality would result in a Red or Severity Level I finding. The inspectors based this conclusion on multiple supplements in the Enforcement Policy identifying an inadvertent criticality as a Severity Level I violation. The inspectors qualitatively considered the amount of remaining margin to an inadvertent criticality while preparing the Appendix M evaluation. In this case, of the two required criticality controls (soluble boron and rack geometry/design), one criticality control (the rack design with neutron absorber capability) was significantly degraded and it could not be determined if other, untested rack locations could be more degraded.

The performance deficiency did not meet the criteria for an old design issue. NRC IMC 0305, "Operating Reactor Assessment Program," Section 04.11 defines an "old design issue" as an inspection finding involving a past design-related problem in the engineering calculations or analyses, the associated operating procedure, or installation of plant equipment that does not reflect a performance deficiency associated with existing licensee programs, policy, or procedures. As discussed in Section 12.01 of this IMC, some old design issues may not be considered in the assessment program. Section 12.01(a) provides guidance for the treatment of old design issues, and states that the NRC may refrain from considering safety significant inspection findings in the assessment program for a design-related finding in the engineering calculations or analysis, associated operating procedure, or installation of plant equipment that meets all of the following criteria:

1. It was licensee-identified as a result of a voluntary initiative such as a design basis reconstitution. For the purposes of IMC 0305, self-revealing issues are not considered to be licensee-identified. Self-revealing issues are those deficiencies which reveal themselves to either the NRC or licensee through a change in process, capability or functionality of equipment, or operations or programs.

This criterion was not met. The issue was identified jointly by staff from the NRC's Office of Nuclear Reactor Regulation in discussions with the licensee and by the NRC resident inspectors during review of condition reports.

2. It was or will be corrected, including immediate corrective action and long term comprehensive corrective action to prevent recurrence, within a reasonable time following identification (this action should involve expanding the initiative, as necessary, to identify other failures caused by similar root causes). For the purpose of this criterion, identification is defined as the time from when the significance of the finding is first discussed between the NRC and the licensee. Accordingly, issues being cited by the NRC for inadequate or untimely corrective action are not eligible for treatment as an old design issue.

This criterion was not met. The issue has not been corrected and the licensee remains in non-compliance.

3. It was not likely to be previously identified by recent ongoing licensee efforts such as normal surveillance, quality assurance activities, or evaluation of industry information.

This criterion was not met. There were multiple opportunities for the licensee to identify the issue.

4. The issue does not reflect a current performance deficiency associated with existing licensee programs, policy, or procedure.

This criterion was not met. The issue reflected current performance as of the time the inspectors identified the issue because the degradation was on-going.

The inspectors concluded the issue met none of the criteria for treatment as an old design issue.

The inspectors identified two cross-cutting aspects of Problem Identification and Resolution. One cross-cutting aspect associated with (P.1 (c)) was identified because the licensee did not properly evaluate the problems associated with Boraflex degradation to assure operability and reliability was adequately addressed. The second cross-cutting aspect associated with (P.1(d)) was identified because the licensee did not implement effective corrective actions for degradation of Boraflex neutron absorber material.

Enforcement:

Apparent Violation: TS 5.5.1.1.a states that the Unit 3 spent fuel storage racks are designed to provide safe subcritical storage of fuel assemblies and shall be maintained with K_{eff} equivalent to less than 1.0 when flooded with unborated water. 10 CFR 50.68(b)(4) states that if no credit for soluble boron is taken, the k-effective (K_{eff}) of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed .95, at a 95 percent probability, 95 percent confidence level, if flooded with unborated water. If credit is taken for soluble boron, the K_{eff} of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed .95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and K_{eff} must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water.

Contrary to the above, licensee calculations and test data indicate that due to dissolution of Boraflex panels in the Turkey Point Unit 3 spent fuel storage racks, K_{eff} was not maintained equivalent to less than 1.0 for all cases when flooded with unborated water. To increase safety margin to an inadvertent criticality, the Unit 3 spent fuel pool minimum boron concentration was increased from 1950 to 2100 ppm. Additional actions were planned. The issue was documented in condition report 2009-34470. This finding was previously identified as AV 05000250/2009-005-03.

Apparent Violation: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Turkey Point UFSAR page 9.5-12, states that the most limiting case obtained to assure K_{eff} was equivalent to less than 1.0, in Region II was a reduction of Boraflex nominal areal density by 50%.

Contrary to the above, a condition adverse to quality, i.e., the degradation of Boraflex in the Unit 3 spent fuel pool, was not promptly and effectively corrected such that in November 2009 two spent fuel pool storage cells were identified with Boraflex degradation greater than that assumed in the criticality analyses that had been allowed to remain in service even after the licensee had revised SFP management controls which prohibited placing fuel assemblies in SFP cells with more than 50% degradation in Boraflex areal density. When brought to the attention of the licensee by the NRC, condition report 2009-34470 was written to document the non-compliance. This finding was previously identified as AV 05000250/2009-005-05.

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- .2 The report also documents three AVs related to improper evaluation of plant conditions associated with Boraflex degradation to assure operability and reportability was adequately addressed. These AVs impacted the NRC's regulatory process and, as such, are being evaluated using the NRC's traditional enforcement process.

Introduction:

(TBD) The inspectors identified an AV of 10 CFR 50.73(a)(2)(B) for failure to report to the NRC, in December 2009 when a condition prohibited by Technical Specifications was identified after testing of Boraflex panels in the Unit 3 SFP revealed degradation for some panels beyond the minimum values specified in the UFSAR.

(TBD) The inspectors identified an AV of 10 CFR 50.59(d)(1) for failure to maintain records that include a written evaluation which provides the bases for the determination that a change, test, or experiment does not require a license amendment. Specifically, the licensee received NRC approval to make changes to the facility via license amendment No. 234 dated July 17, 2007, involving the design of the SFP storage racks, including the use of Metamic inserts, and other hardware, administrative, and testing methods, to assure that the spent fuel pool remains within design limits. Subsequent to the NRC's approval, the licensee determined that Metamic inserts could not be installed by that date approved by the NRC. However, the licensee maintained no written evaluation which provided the bases for the determination that the change to the design of the spent fuel pool storage racks, without the use of Metamic inserts, did not require a license amendment pursuant to paragraph (c)(2) of 10 CFR 50.59.

(TBD) The inspectors identified an AV of 10 CFR 50.71(e) requirements for failure to periodically update the FSAR so that the report contains effects of changes made to the facility. As of December 2009, changes made to manage the Unit 3 SFP since 2001, including the use of alternate means of assuring that the spent fuel remains shutdown such as, use of rod control cluster assembly inserts and water holes, use of neutron attenuation testing methods and results, and use of computer programs such as RACKLIFE were not described in the UFSAR. When identified to the licensee by the inspectors, the licensee documented the condition in condition report 2009-34470, and informed the NRC (in letter L-2009-295, dated December 31, 2009) of plans to make appropriate updates to the FSAR descriptions by March 15, 2010.

Description:

Condition Report 2004-3226 documented that Boraflex areal density for one panel of storage cell R19 was below that assumed in the Safety Evaluation Report for the SFP criticality analysis. Further the degradation occurred at an estimated absorbed dose lower than expected. The condition report also stated that there was no operability concern and that the condition was not reportable because the Technical Specification limit for soluble boron (1950 ppm) was greater than the analysis value to assure subcriticality (1382 ppm). Technical Specification 5.5.1.1.a stated that the SFP shall be maintained with a K_{eff} less than 1.0 when flooded with unborated water using the conservative allowance for uncertainties as described in the UFSAR.

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Condition Report 2007-40769 documented that some of the Boraflex panels in the Unit 3 spent fuel pool were predicted to degrade beyond the design basis assumed areal density, and that compensatory measures were required to satisfy Technical Specification requirements. Testing documented in FPL letter to NRC dated May 16, 2001, revealed the west panel of storage cell M16, with degradation beyond that assumed in the criticality analysis (0.006 gm-B10/cm²). However, the operations department operability screening in the condition report stated: "This is an administrative issue that does not affect compliance with Technical Specifications." The inspectors found that the use of compensatory measures to maintain design margins, although in place for more than five years, had not been included in the UFSAR descriptions. The licensee could not demonstrate to the inspectors that the compensatory measures had been appropriately screened to assure that prior NRC approval was not required.

Analysis:

The failure to make a required report to the NRC in accordance with 10 CFR 50.73 related to either the identified design deficiency or the failure to comply with Technical Specification requirements was a violation. This finding was evaluated using the traditional enforcement process because it impacted the NRC's ability to perform its regulatory function and is also being considered for escalated enforcement action in accordance with NRC Enforcement Policy. No cross-cutting aspect associated with this issue was identified.

The failure to appropriately screen compensatory measures used to assure subcritical conditions in the spent fuel pools at Turkey Point and the resulting failure to maintain the UFSAR was a violation of 10CFR 50.71(e). As a result, the UFSAR did not accurately describe the uncertainties used to maintain design margins in the Unit 3 spent fuel pool and fuel storage was not in compliance with Technical Specification 5.5.1.1.a requirements. Appropriate corrective actions such as those contained in a license amendment which provided Boraflex remedies, issued by the NRC on July 17, 2007, had not been implemented. The Unit 3 spent fuel pool remains in non-compliance. This finding was evaluated using the traditional enforcement process because it impacted the NRC's ability to perform its regulatory function and is also being considered for escalated enforcement action in accordance with NRC Enforcement Policy. No cross-cutting aspect associated with this issue was identified.

The failure to maintain records that include a written evaluation which provides the bases for the determination that a change, test, or experiment does not require a license amendment was a violation 10 CFR 50.59(d)(1). Specifically, the licensee received NRC approval to make changes to the facility via license amendment No. 234 dated July 17, 2007, involving the design of the spent fuel pool storage racks, including the use of Metamic inserts, and other hardware, administrative, and testing methods, to assure that the spent fuel remains within design limits. This finding was evaluated using the traditional enforcement process because it impacted the NRC's ability to perform its regulatory function and is also being considered for escalated enforcement action in accordance with NRC Enforcement Policy. The inspectors determined that the cross-cutting aspect of Human Performance, (H.4 (c)) is applicable to this issue because the

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licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported, when errors in administering Technical Specification requirements and programmatic controls which assure safety were not effectively implemented.

Enforcement:

Apparent Violation: 10 CFR 50.73(a)(2)(B) states that the licensee shall report to the NRC any condition which was prohibited by the plant's Technical Specifications. Technical Specification 5.5.1.1.a states that the Unit 3 spent fuel storage racks are designed to provide safe subcritical storage of fuel assemblies and shall be maintained with K_{eff} equivalent to less than 1.0 when flooded with unborated water, which includes a conservative allowance for uncertainties as described in the UFSAR.

Contrary to the above, as of December 2009, a condition prohibited by Technical Specifications was not reported to the NRC after testing of Boraflex panels in the Unit 3 SFP revealed areal density of Boraflex in certain storage locations had degraded beyond values specified in the UFSAR. When identified to the licensee by the NRC, condition report 2009-30043 was written to evaluate and report the non-compliance with Technical Specifications to the NRC. The licensee has been aware of the Boraflex degradation exceeding UFSAR specified values since 2001 when testing revealed that Boraflex degradation had exceeded predicted values. This finding was previously identified as AV 05000250/2009005-04.

Apparent Violation: 10 CFR 50.71(e) requires that licensees periodically update their FSAR so that the report contains effects of changes made to the facility such that the FSAR is complete and accurate.

Contrary to the above, the licensee failed to update the FSAR so that the report contains effects of changes made to the facility. As of December 2009 changes made to manage the Unit 3 spent fuel pool since 2001, including the use of alternate means of assuring that the spent fuel remains shutdown such as use of rod control cluster assembly inserts and water holes, and the use of neutron attenuation testing methods and computer programs such as RACKLIFE were not described in the UFSAR. When identified to the licensee by the inspectors, the licensee documented the condition in condition report 2009-34470, and informed the NRC (in letter L-2009-295, dated December 31, 2009) of plans to make appropriate updates to the FSAR descriptions by March 15, 2010. This finding was previously identified as AV 05000250/2009005-06.

Apparent Violation: 10 CFR 50.59(d)(1) requires licensees to maintain records of changes in the facility, of changes in procedures, and of tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for the determination that the change, test, or experiment does not require a license amendment pursuant to paragraph (c)(2) of this section.

Contrary to the above, as of October 2009, the licensee has failed to maintain records that include a written evaluation which provides the bases for the determination that a

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change, test, or experiment does not require a license amendment. Specifically, the licensee received NRC approval to make changes to the facility via license amendment No. 234 dated July 17, 2007, involving the design of the spent fuel pool storage racks, including the use of Metamic inserts, and other hardware, administrative, and testing methods, to assure that the spent fuel remains within design limits. Subsequent to the NRC's approval, the licensee determined that Metamic inserts could not be installed by that date approved by the NRC. However, the licensee maintained no written evaluation which provided the bases for the determination that the change to the design of the spent fuel pool storage racks, without the use of Metamic inserts, did not require a license amendment pursuant to paragraph (c)(2) of 10 CFR 50.59. This finding is identified as AV 05000250/2010008-01, Failure to perform adequate written 50.59 evaluation.

4OA6 Management Meetings

.1 Exit Meeting Summary

On March 11, 2010, the inspection results were presented to Mr. Kiley of your staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

Attachments: 1. Supplemental Information
2. Appendix M

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

N. Bach, Chemistry Manager
C. Cashwell, Radiation Protection Manager
M. Crosby, Quality Manager
M. Kiley, Site Vice-President
P. Rubin, Plant General Manager (Acting)
R. Tomonto, Licensing Manager
R. Wright, Operations Manager

NRC personnel:

M. Sykes, Branch Chief, DRP
L. Wert, Director, Division of Reactor Projects, Region II

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000250/2010008-01 AV Failure to perform adequate written 50.59 evaluation.

Qualitative Decision-Making Attributes for NRC Management Review

Decision Attribute	Applicable to Decision?	Basis for Input to Decision - Provide qualitative and/or quantitative information for management review and decision making.
Finding can be bounded using qualitative and/or quantitative information?	Yes	The worst case condition for the spent fuel pool (SFP) would be complete loss of the neutron absorption capability of the Boraflex. In Boraflex testing, some Boraflex remained in all cells, although degradation beyond predictions had been observed. The licensee had used rod cluster assemblies and water holes to maintain the areas of the pool most susceptible to degradation, but loss of Boraflex had been observed in other pool areas.
Defense-in-depth affected?	Yes	The affected region was designed and licensed to maintain K_{eff} less than 0.95. This limit allows for inaccuracies, variations, and human error while still preventing a criticality. In this case, the degradation severely eroded the margin to criticality. However, several factors mitigate the margin lost due to Boraflex degradation. These include: Soluble Boron in excess of the minimum concentration needed to maintain $K_{eff} < 0.95$ Mixing of irradiated fuel with new fuel Use of RCCAs and water holes
Performance deficiency effect on the safety margin maintained?	Yes	The performance deficiency resulted in a significant impact on the amount of safety margin. The degradation of the neutron absorber adversely affected K_{eff} in the pool, potentially resulting in a K_{eff} exceeding 0.95. A more serious scenario would involve a dilution event and the inability of the pool to self-mitigate the propagating effects of an inadvertent criticality.
The extent the performance deficiency affects other equipment.	Yes	Testing of the Unit 4 SFP is scheduled to be completed Spring 2010. It is not clear whether the Unit 4 SFP will be similarly affected.
Degree of degradation of failed or unavailable component (s)	Yes	The licensee conducted three campaigns to evaluate degradation of the SFP using BADGER testing. The first campaign, in 2001 identified degradation was occurring. Subsequent campaigns were done in 2004 and 2007 where degradation greater than predicted by the licensee's models were exceeded.

<p>Per Period of time (exposure time) affect on the performance deficiency.</p>	<p>Yes</p>	<p>The licensee installed the racks in about 1970. The licensee did not maintain an as-installed Boraflex sample and can not definitively quantify the actual degradation.</p> <p>High silica levels in the Unit 3 SFP and black debris on the pool bottom shows that the Boraflex continues to degrade. Testing revealed degradation beyond predictions as early as 2001.</p>
<p>Likelihood that the licensee's recovery actions would successfully mitigate the performance deficiency.</p>	<p>No</p>	<p>The condition represents a potential initiating event. The event would be a SFP criticality. In such an event, significant consequences could occur before the criticality ceased. The degradation of the fixed neutron absorber resulted in a significant loss of one of the two barriers preventing criticality in the spent fuel pool (SFP). It could not be determined if other, untested racks locations, could be more degraded.</p> <p>The licensee does not have criticality monitors nor procedures to address a SFP criticality.</p> <p>The licensee will need to re-establish compliance with requirements by installing hardware to meet design requirements or via license amendment.</p>
<p>Additional qualitative circumstances associated with the finding that regional management should consider in the evaluation process.</p>	<p>Yes</p>	<p>The inspectors identified one cell (L38) that had required a Boraflex remedy per the licensee's program that had not been remediated. The licensee identified another (F19). Both had been missed in the licensee's oversight. Subsequent specific criticality evaluations for these cells by the licensee showed margin.</p> <p>The licensee had not done a comprehensive criticality evaluation of the SFP.</p> <p>The inspectors reviewed recent findings at other facilities related to criticality controls and concluded that a preliminary Greater than Green finding was appropriate.</p> <p>Finally, the inspectors reviewed Supplement VI of the NRC Enforcement Policy to ensure an informed conclusion would be made in determining the significance of the finding. The inspectors concluded that this condition corresponded to a Severity Level III violation if traditional enforcement were used. The inspectors evaluation is summarized as follows:</p>

<p>Review of Enforcement Policy, Section VI:</p> <p>Enforcement Policy Supplement VI dated January 14, 2005, provides guidance on evaluating violations related to criticality controls. The following examples are germane to the significance determination:</p>	
Severity Level I:	<p>A nuclear criticality accident;</p> <p>No Nuclear Criticality accident occurred; therefore the finding is not equivalent to Severity Level I.</p>
Severity Level II:	<p>A failure to establish, implement, or maintain all criticality controls (or control systems) for a single nuclear criticality scenario when a critical mass of fissile material was present or reasonably available, such that a nuclear criticality accident was possible;</p> <p>Although a critical mass of fissile material was present, some controls were still in place. Specifically, soluble boron was in the SFP and some Boraflex remained. Therefore the finding is not equivalent to Severity Level II.</p>

Severity Level III:	<p>11. A system designed to prevent or mitigate a serious safety event being degraded to the extent that a detailed evaluation would be required to determine its operability;</p> <p>In this case, the Boraflex, which is part of the storage system designed to prevent the serious safety event of a criticality was substantially degraded. The licensee needed to perform a detailed evaluation, including testing of the SFP racks and additional criticality analysis to determine operability. These evaluations determined that the SFP no longer met its design function. In addition, the licensee's analysis still includes uncertainties such that the NRC can not conclude that the analysis bounds the SFP conditions. Therefore, the finding is equivalent to Severity level III.</p> <p>12. Changes in parameters that cause unanticipated reductions in margins of safety;</p> <p>In this case, the Boraflex degraded and the degradation led to an unanticipated and significant reduction in margins of safety. Therefore, the finding is equivalent to Severity Level III.</p> <p>16. A failure to establish, maintain, or implement all but one criticality control (or control systems) for a single nuclear criticality scenario when a critical mass of fissile material was present or reasonably available, such that a nuclear criticality was possible;</p> <p>In this case, a critical mass of fissile material was present. The licensee maintained control of the SFP boron concentration, although soluble boron was not credited in Region I of the SFP. The inspectors consider a dilution event to be an unlikely, although credible, scenario. This conclusion is in concert with 10 CFR 50.68 which requires K_{eff} to be less than 1 when soluble boron is used for criticality control. Several scenarios were analyzed that may result in K_{eff} greater than 1.0. However, the results depend on assumed areal boron density. Based on review of the licensee's analysis and the presence of significant quantities of soluble boron, the inspectors concluded that equivalent of one criticality control remained. Therefore, the finding is equivalent to Severity Level III.</p>
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Result of Management review: Greater than Green based on the significant degradation of margin in one of the two required barriers to prevent criticality in the SFP.