



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

June 13, 2006

Florida Power and Light Company
ATTN: Mr. J. A. Stall, Senior Vice President
Nuclear and Chief Nuclear Officer
P. O. Box 14000
Juno Beach, FL 33408-0420

SUBJECT: TURKEY POINT NUCLEAR PLANT - NRC SUPPLEMENTAL INSPECTION
REPORT NOs. 05000250/2006013 AND 05000251/2006013

Dear Mr. Stall:

On May 19, 2006, the US Nuclear Regulatory Commission (NRC) completed a supplemental inspection at your Turkey Point, Units 3 and 4, facility. The enclosed report documents the inspection findings, which were discussed on May 19, 2006, with you and other members of your staff.

As required by the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed in accordance with Inspection Procedure 95001. The purpose of the inspection was to examine the causes for and actions taken related to; (1) the performance indicator for excessive safety system unavailability for the heat removal system (due to a degraded auxiliary feedwater pump) crossing the threshold from Green (very low risk significance) to White (low to moderate risk significance) for Units 3 and 4 in the fourth quarter of 2005, and (2) the White finding for the auxiliary feedwater pump B being out of service for greater than the technical specification allowed outage time due to an incorrectly installed bearing and subsequent inadequate corrective actions, NOV 05000250,251/2006010. This supplemental inspection was conducted to provide assurance that the root causes and contributing causes of the events resulting in the White performance indicator and finding are understood, to independently assess the extent of condition, and to provide assurance that the corrective actions for risk significant performance issues are sufficient to address the root causes and contributing causes and to prevent recurrence. The inspection consisted of selected examination of representative records and interviews with personnel.

Based on the results of this inspection, no findings of significance were identified. The inspector determined that, in general, the problem identification, root cause and corrective actions were adequate. However, several deficiencies were identified by the inspector relating to the thoroughness and quality of the root cause evaluation and subsequent corrective actions. Of note, the root cause evaluation did not identify that an evaluation required by the ASME code was not completed when the auxiliary feedwater pump B was returned to service with high vibrations on September 3, 2003. Therefore, the White finding, NOV 05000250,251/2006010, will remain open pending development of corrective actions to address these NRC-identified weaknesses.

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 the 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/

Joel T. Munday, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket Nos. 50-250, 50-251
License Nos. DPR-31, DPR-41

Enclosure: Inspection Report 05000250/2006013 and 05000251/2006013
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Report to J. A. Stall from Joel T. Munday dated June 13, 2006.

SUBJECT: TURKEY POINT NUCLEAR PLANT - NRC SUPPLEMENTAL INSPECTION
REPORT NOs. 05000250/2006013 AND 05000251/2006013

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-250, 50-251

License Nos: DPR-31, DPR-41

Report No: 05000250/2006013, 05000251/2006013

Licensee: Florida Power & Light Company (FP&L)

Facility: Turkey Point Nuclear Plant, Units 3 and 4

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

Dates: May 15, 2006 - May 19, 2006

Inspector: Shakur A. Walker, Resident Inspector, McGuire Nuclear Station

Approved by: Joel T. Munday, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000250/2006-013, 05000251/2006-013; 05/15/2006 - 5/19/2006; Turkey Point Nuclear Power Plant, Units 3 and 4; Supplemental Inspection IP 95001 for a White performance indicator in the mitigating systems cornerstone, other activities.

This inspection was conducted by a resident inspector. No violations of regulatory requirements were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process", Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- This supplemental inspection was conducted in accordance with Inspection Procedure 95001, to assess the licensee's evaluation associated with; (1) the performance indicator for excessive safety system unavailability for the heat removal system (due to a degraded auxiliary feedwater pump) crossing the threshold from Green (very low risk significance) to White (low to moderate risk significance) for Units 3 and 4 in the fourth quarter of 2005, and (2) the White finding for the auxiliary feedwater pump B being out of service for greater than the technical specification allowed outage time due to an incorrectly installed bearing and subsequent inadequate corrective actions, NOV 05000250,251/2006010. Specifically, the Unit 3 and 4 shared "B" turbine driven auxiliary feedwater pump was discovered in a degraded condition on November 7, 2005. The licensee determined the pump had an incorrectly installed bearing which resulted in inadequate lubrication of the inboard pump bearing. The pump was determined to be inoperable and unable to meet its expected mission time from December 14, 2004 until November 11, 2005.

The licensee's problem identification, root cause and extent-of-condition evaluations, and corrective actions for the degraded pump were generally adequate. However, several deficiencies were identified by the inspector relating to the thoroughness and quality of the root cause evaluation and subsequent corrective actions. Of note, the root cause evaluation did not identify that an evaluation required by the ASME code was not completed when the auxiliary feedwater pump B was returned to service with high vibrations on September 3, 2003. Therefore, the White finding, NOV 05000250,251/2006010, will remain open pending development of corrective actions to address these NRC-identified weaknesses.

B. Licensee-Identified Violations

None.

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REPORT DETAILS

01 INSPECTION SCOPE

The purpose of this supplemental inspection was to assess the licensee's evaluation associated with: (1) the performance indicator for excessive safety system unavailability for the heat removal system (due to a degraded auxiliary feedwater pump) crossing the threshold from Green (very low risk significance) to White (low to moderate risk significance) for Units 3 and 4 in the fourth quarter of 2005, and (2) the White finding for the auxiliary feedwater pump B being out of service for greater than the technical specification allowed outage time due to an incorrectly installed bearing and subsequent inadequate corrective actions, NOV 05000250,251/2006010. Specifically, the licensee discovered the "B" turbine driven (TD) auxiliary feedwater (AFW) pump, which is shared between Units 3 and 4, with an incorrectly installed inboard bearing during the fourth quarter of 2005. The licensee determined the condition existed since September 2003 following a pump overhaul. The licensee performed a root cause evaluation of the incorrect bearing installation to identify performance and process issues that led to the event. The inspector reviewed the licensee's actions associated with this event, reviewed plant procedures and pump data, and conducted interviews with licensee personnel to ensure that the root and contributing causes of the events were identified, understood, and appropriate corrective actions were initiated.

02 EVALUATION OF INSPECTION REQUIREMENTS

02.01 Problem Identification

- a. Determination of who identified the issue and under what conditions.

The licensee identified the degraded bearing during a scheduled surveillance test on November 7, 2005. During Inservice Testing (IST) the "B" AFW pump exhibited high vibration and temperatures at the inboard journal bearing. The reading was documented as 0.8 in/sec which exceeded the Required Action range for vibration of 0.7 in/sec. The pump was subsequently shutdown and declared inoperable.

On November 8, 2005, the AFW pump was disassembled for inspection. The licensee identified signs of uneven tooth wear on the pump coupling as well as evidence of grease caking. Further inspection of the inboard journal bearing found that the bearing was installed rotated 90 degrees from its correct orientation. This incorrect installation resulted in inadequate lubrication to the bearing and caused flaking of the sleeve bearing babbit.

- b. Determination of how long the issue existed, and prior opportunities for identification.

The licensee determined the "B" AFW pump had been inoperable since September 9, 2003. On August 18, 2003, the AFW pump motor oil pump failed and caused severe degradation of the AFW pump bearings. The pump was sent to a 10 CFR Part 50 Appendix B qualified vendor for repair and was rebuilt and returned to the licensee on September 3, 2003. All surveillance testing was completed satisfactorily on September 9, 2003, and the pump was declared operable and returned to service.

The licensee's root cause evaluation stated that with the exception of high bearing vibrations, there was no evidence that demonstrated performance degradation (i.e, increased bearing

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temperature, abnormal oil analysis, flow). The evaluation also stated that if more than one performance parameter had been observed to be trending abnormally, immediate action would have been taken.

The inspector noted two weaknesses with the licensee's conclusions. First, when the AFW pump was returned to service following overhaul on September 9, 2003, the initial test data indicated that vibrations were approximately twice as high as when it was removed from service. The IST Procedure, per the ASME OM CODE, Code for Operation and Maintenance of Nuclear Power Plants - Subsection ISTB, requires that for this condition, an evaluation should have been performed to assess the deviated values and to verify the acceptability of the abnormally high vibration readings, however, it was not. The inspector considered this to be a missed opportunity to have identified the inoperable pump much sooner. The licensee stated that although a formal evaluation was not documented per the IST procedure, and as required by the ASME code, a similar evaluation was, in fact, being discussed.

Secondly, the inspector concluded that the monthly oil analysis that was being performed for this pump did include indications that abnormal bearing or shaft wear was occurring. Slight traces of tin (indicative of bearing wear) were being identified for several months prior to the discovery of the degraded pump condition on November 7, 2005. Although the particle count was only slightly elevated, when combined with the increased vibrations, more investigation as to a link between the two conditions could have resulted in a more timely identification of the degrading bearing.

A violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action was previously issued on April 17, 2006, in Inspection Report 05000250,251/200610, as a result of the licensee's failure to identify and correct the condition which led to the pump being inoperable. Following discussions with the inspector, the licensee indicated plans to contract a vendor to independently analyze the oil data and other pump parameters to identify any programmatic weaknesses.

- c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issues.

The Licensee Event Report (LER) 05000250,251/2005-006-00, for the inoperable turbine driven AFW pump documented the qualitative plant specific safety significance for this issue. The licensee identified that in the event of a complete failure of the AFW system, there were two non-safety grade standby steam generator feedwater pumps available to supply water from the demineralized water storage tank to the steam generators. However, the licensee stated that the final safety significance of the event will be included in a supplement to this LER.

The licensee also conducted a quantitative risk assessment (significance determination process phase 3 analysis) in response to the preliminary White finding documented in Integrated Inspection Report 05000250,251/2005005, dated January 27, 2006. Their March 13, 2006 response letter concluded that the finding was of very low safety significance, Green. On April 17, 2006, the NRC issued its Final Significance Determination and Notice of Violation as Inspection Report 05000250,251/2006010, and concluded the issue was White, having low to moderate safety significance. In a letter issued on April 27, 2006, the licensee appealed the

Final Significance Determination results, however, the significance of the issue was upheld and documented in a letter back to the licensee on May 18, 2006.

02.02 Root Cause and Extent-of-Condition Evaluation

- a. Evaluation of methods used to identify root causes and contributing causes.

The licensee used the cause-and-effect analysis method to evaluate the variety of potential causes and contributing factors associated with this event. In addition, the licensee employed the efforts of an independent contractor to perform an independent cause analysis of the degraded pump bearing to determine if and when the pump would not have met its specified safety function and associated mission time. The methods employed to identify root and contributing causes for the incorrectly installed bearing were generally adequate.

- b. Level of detail of the root cause evaluation.

The licensee's root cause evaluation, documented in CR 2005-30750, identified the primary cause of the condition was incorrect installation of the bearing by the vendor due to an inadequate procedure. The procedure utilized for reassembly and installation of the bearing relied on skill of the craft, rather than provide prescriptive guidance, however, it was based on input provided by the licensee. Additionally, although the licensee had representatives at the pump rebuild facility during the refurbishment, they were focused on the work plan completion rather than the work execution. The licensee's corrective actions, discussed in Section 02.03 of this report, have addressed this issue of vendor oversight.

Additionally, the licensee identified four contributing causes that affected the pump and impacted its ability to perform its intended function, including: 1) misaligned pump shaft due to incorrect alignment criteria in the assembly procedure, 2) discovery of grout voids in the pump baseplate, 3) lack of vendor oversight, and 4) lack of understanding the risk significance of scheduled work and maintenance. The inspector determined that the evaluation of the root cause analysis was sufficiently detailed to support the root and contributing causes identified.

- c. Consideration of prior occurrences of the problem and knowledge of prior operating experience.

The inspector determined that the cause evaluation for the degraded AFW pump considered prior occurrences of similar problems where applicable. The licensee had discovered weaknesses concerning vendor quality and vendor oversight previously, however, those concerns were initially limited to commercial vendors and did not include Appendix B qualified vendors. This weakness is discussed in NRC Supplemental Inspection Report 05000250,251/2005011.

- d. Consideration of potential common causes and extent of condition of the problem.

The licensee's evaluation considered the potential for common cause and extent of condition associated with the incorrectly installed pump bearing. The licensee determined that the root cause of inadequate vendor installation of the pump bearing was not limited to the "B" AFW pump and could potentially affect the other turbine driven auxiliary feedwater pumps that had

been refurbished or repaired by vendors. The inspector agreed that this problem was not limited to the "B" AFW, as they had previously identified problems with vendor oversight and vendor maintenance, as discussed in Supplemental Inspection Report 05000250,251/2005011. As a result, the licensee disassembled the remaining auxiliary feedwater pumps to verify proper configuration. No further deficiencies were identified.

02.03 Corrective Actions

a. Appropriateness of corrective actions.

Upon discovering the degraded condition of the "B" AFW pump on November 7, 2005, the licensee took prompt corrective action by immediately disassembling the pump and correcting the degraded condition. Subsequent testing demonstrated satisfactory results. This immediate corrective action addressed the primary root cause discussed in Section 02.02.b of this report. The licensee also established corrective actions to revise the auxiliary feedwater maintenance procedure to incorporate specific pump shaft alignment criteria and to address the voids in the pump baseplate.

The inspector also reviewed corrective actions to develop and implement a Risk Screening and Prioritization tool for all work activities. This tool will be used to apply a risk ranking to scheduled work activities and determine proper priority. Additionally, the licensee augmented the procedure inspection requirements regarding vendor oversight and procurement. The licensee also identified an enhancement to review the practices and requirements with respect to this event for the predictive maintenance program. The inspector noted, given the weaknesses identified in 02.01.b of this report, this enhancement seemed appropriate.

However, because the root cause evaluation failed to identify that an IST required evaluation had not been completed, there were no corrective actions assigned for this issue. The licensee acknowledged this weakness by initiating CR 2006-15466, Documentation Discrepancies Associated with the "B" TDAFW IST Performed on 9/9/03. This weakness is similar to one identified in a previous 95001 Inspection conducted in December 2005 and documented in NRC Supplemental Inspection Report 05000250,251/2005011. Pending the licensee's revision to the root cause evaluation including the development of corrective actions to address the failure to identify the missing IST evaluation, the White finding associated with the degraded "B" turbine driven AFW pump, NOV 05000250,251/2006010 will remain open.

b. Prioritization of corrective actions.

The inspector determined that the corrective actions for the degraded "B" AFW were adequately prioritized.

c. Establishment of a schedule for implementing and completing the corrective actions

The inspector verified that the licensee's corrective action program identified assigned individuals, completion dates, and reference numbers to ensure that individual corrective actions would be completed in accordance with their priority.

- d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrence.

The inspector determined that effectiveness reviews had been scheduled for the causes surrounding the degraded "B" AFW pump. These effectiveness reviews were planned upon completion of the applicable corrective actions. Additionally, the licensee has placed the AFW system in a(1) status in accordance with 10 CFR 50.65, and subsequently has enhanced its monitoring of the AFW pumps to ensure that any additional abnormal conditions/trends are given appropriate management attention.

03 OTHER ACTIVITIES

- .1 (Closed) LER 05000250,251/2005-06-00: Incorrect Installation of Inboard Journal Bearing in Auxiliary Feedwater Pump B

The inspector reviewed the subject LER and CR 2005-30750 to assess the cause and licensee actions taken to address the incorrectly installed bearing on the "B" auxiliary feedwater pump that resulted in an inoperable and degraded condition. The cause of the degradation was attributed to incorrect assembly by the vendor who overhauled the pump. Initial corrective actions included disassembling the degraded pump and making necessary repairs. The root cause of the pump degradation was in the final approval stage at the time the LER was submitted. No new issues or additional findings associated with inoperability of the pump were identified during the LER closeout review. The root cause and corrective actions were subsequently completed and documented in CR 2005-30750. The licensee plans to submit a supplement to the LER to document the results of the approved root cause evaluation, along with any additional corrective actions and the final safety significance determination.

04 MANAGEMENT MEETINGS

Exit Meeting Summary

The inspector presented the results of the supplemental inspection to Mr. M. Pearce and other members of licensee management and staff on May 19, 2006. The inspector confirmed that any proprietary information provided or examined during the inspection would be returned.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Jones, Site Vice-President
M. Pearce, Plant General Manager
J. Baysinger, Procurement
R. Everett, Licensing
S. Greenlee, Engineering Manager
D. Hoffman, Operations Superintendent
M. Navin, Operations Manager
J. Pallin, Predictive Maintenance Supervisor
W. Parker, Licensing Manager
D. Poirier, Maintenance Manager
W. Pravatt, Work Controls Manager
M. Moore, Corrective Actions Supervisor
S. Greenlee, Engineering Manager

NRC personnel:

S. Stewart, NRC Site Senior Resident Inspector
T. Kolb, NRC Site Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Discussed

05000250,251/2006010	NOV	AFW Pump B Out of Service Greater Than TS Allowed Due to Incorrect Bearing Installation (Section 02.03)
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Closed

05000251/2005-006-00	LER	Incorrect Installation of Inboard Journal Bearing in Auxiliary Feedwater Pump B (Section 03.01)
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LIST OF DOCUMENTS REVIEWED

Procedures

0-ADM-068.4, Work Load Backlog Risk Based Analysis, Rev. dated 3/6/06
0-ADM-080, Controlling Purchase, Repair and Use of Material and Equipment for High Functional Importance Applications, Rev. dated 10/31/05
0-OSP-075.11, Auxiliary Feedwater Inservice Test, Rev. dated 8/7/02, completed 9/9/03
NAP-204, Condition Reporting, Rev. 8
PdM-I-003, Vibration Program, Rev. dated 5/2/06
TP 05-021, AFW Bearing Tests, Rev. dated 11/17/05, completed 12/15/05
QI 7-QAD-3, Source Surveillance of Supplier Activities, Rev. 24

Licensee Event Reports (LERs)

2005-006-00, Incorrect Installation of Inboard Journal Bearing in Auxiliary Feedwater Pump B

Condition Reports (CR)

2003-2174, "B" AFW pump lube oil foot valve failure caused pump failure
2003-2555, PdM measured abnormally high axial vibrations on B AFW Turbine
2004-3007, Trend data indicates that Pump Inboard Vertical (PIV) Vibration level for B AFW pump may exceed the Alert level in near future
2004-8132, During the Quarterly IST for B AFW pump, the PIV exceeded the Alert level
2005-8334, Post trip condition reported B AFW pump inboard bearing temperature warmer than other pumps
2005-8435, Address adverse trend for B AFW pump bearing (bearing temp and vibration increase)
2005-6315, "B" AFW pump IB vibration levels high
2005-30750, B AFW pump exceeded Required Action levels on temperature and vibration and declared inoperable

Work Orders

35023687-04, Auxiliary Feedwater Pump P2A, Inspect Inboard Bearing
35010765-01, AFW Pump P2B, Replace Motor Oil Pump Foot Valve/ Change Oil
34020890-01, AFW Pump P2B, Filter Oil in Reservoir

Miscellaneous

10 CFR Part 21 Internal Evaluation Form from Sulzer Pumps, Inc. dated 3/21/06
Analysts Maintenance Labs, Inc., WO 35006857 (historical oil analysis summation)
Analysts Maintenance Labs, Inc, Visual Debris Analysis Report for Component Ref. 178233 (historical review)
FPL Surveillance Report, 08.06.SULLA.03.1, dated 8/23-29/03
Sulzer Pump Inc., Hydrostatic Test Data Sheet, WO 08701898-10, dated 8/29/03
QC Inspection Report for 08.06.SULLA.03.1, dated 8/30/03
Sulzer Pump, Inc Sales Order 08701898
FPL Supplier Deviation Notice, Purchase Order No. 00067845, dated 8/28/03
MPR Associates Report, MPR-2884, Dynamic Analysis of PTN "B" AFW Pump, Rev. 0