

November 16, 2005

Mr. W. Pearce  
Acting Vice President  
FirstEnergy Nuclear Operating Company  
Perry Nuclear Power Plant  
10 Center Road, A290  
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT  
NRC SUPPLEMENTAL INSPECTION REPORT 05000440/2005012

Dear Mr. Pearce:

On October 28, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection at your Perry Nuclear Power Plant. The enclosed report documents the inspection results, which were discussed on October 28, 2005, with you and other members of your staff.

The NRC performed this supplemental inspection to assess your evaluation of a White performance indicator in the Residual Heat Removal System Unavailability area of the Mitigating Systems cornerstone. We conducted this inspection in accordance with Inspection Procedure 95001, "Inspection For One Or Two White Inputs In A Strategic Performance Area," and 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 objectives of this inspection were to: (1) provide assurance that the root causes and the contributing causes for the risk significant performance issues associated with the White performance indicator are understood; (2) provide assurance that the extent of condition and extent of cause of the issues are identified; and (3) provide assurance that corrective actions are sufficient to address the root causes and contributing causes, and to prevent recurrence.

Based on the results of this inspection, we concluded that you understood the root causes and contributing causes of the issues, that you identified the extent of condition and extent of cause of the issues, and that your corrective actions were sufficient to address the causes and to prevent recurrence of the issues.

One finding of very low safety significance, which was a violation of NRC requirements, was identified. However, because the finding was of the very low safety significance and because the issue has been entered into your corrective action program, the NRC is treating the associated violation as a Non-Cited Violation in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest the subject or severity of this Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Perry Nuclear Power Plant.

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Sincerely,

**/RA/**

Mark A. Satorius, Director  
Division of Reactor Projects

Docket No. 50-440  
License No. NPF-58

Enclosure: Inspection Report 05000440/2005012  
w/Attachment: Supplemental Information

cc w/encl: G. Leidich, President - FENOC  
J. Hagan, Chief Operating Officer, FENOC  
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Director, Site Operations  
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-440

License No: NPF-58

Report No: 05000440/2005012

Licensee: FirstEnergy Nuclear Operating Company

Facility: Perry Nuclear Power Plant

Location: Perry, Ohio

Dates: October 24 through October 28, 2005

Inspector: M. Franke, Resident Inspector

Approved by: Eric Duncan, Chief  
Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000440/2005012; 10/24/2005 - 10/28/2005; Perry Nuclear Power Plant; Supplemental Inspection; Inspection Procedure 95001, "Inspection For One Or Two White Inputs In A Strategic Performance Area."

The Perry Resident Inspector performed this supplemental inspection. The inspector identified one finding of very low safety significance and an associated non-cited violation of NRC requirements. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the Significance Determination Process 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 3, dated July 2000.

### **Cornerstone: Mitigating Systems**

The NRC performed this supplemental inspection to assess the licensee's evaluation of a White performance indicator in the Residual Heat Removal System Unavailability area of the Mitigating Systems cornerstone. This supplemental inspection was performed in accordance with Inspection Procedure 95001, "Inspection For One Or Two White Inputs In A Strategic Performance Area." The inspector concluded that: (1) the licensee understood the root causes and contributing causes of the risk significant performance issues that resulted in the White performance indicator; (2) the licensee identified the extent of condition and the extent of cause of the issues; and (3) the licensee's corrective actions were sufficient to address the root causes and contributing causes, and to prevent recurrence.

### **A. Inspector-Identified and Self-Revealed Findings**

Green. The inspector identified a finding of very low safety significance and a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," when licensee personnel failed to correct a condition adverse to quality. Specifically, the licensee failed to correct a condition of inadequate online maintenance management that adversely affected safety system availability. In the second quarter of 2000, the heat removal system unavailability performance indicator crossed the Green-to-White threshold due to inadequate online work management, which led to high safety system unavailability. Between the years 2000 and 2004, the licensee identified on several occasions that safety system unavailability was higher than the industry average and that the station lacked an adequate process to balance online maintenance with safety system unavailability. Additionally, poor work management processes were noted to unnecessarily extend maintenance activities and adversely affect safety system availability. In the second quarter of 2004, the residual heat removal safety system unavailability performance indicator crossed the Green-to-White threshold. The licensee again identified that inadequate online maintenance management and generally higher than industry average safety system unavailability were primary contributing causes. Licensee corrective actions included management of safety system unavailability to 50 percent of the NRC Green-to-White threshold and work management improvements. The primary cause of this finding was related to the cross-cutting area of Problem

Identification and Resolution, subcategory corrective action, since a condition adverse to quality was not corrected in a timely manner.

The finding was more than minor because it was associated with the equipment performance attribute of the reactor safety mitigating systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, from 2000 to 2004, the failure to promptly correct the condition of inadequate management of online work adversely affected safety system availability. The inspector determined that the finding was of very low safety significance because: (1) it did not represent an actual loss of safety function of a system; (2) it did not represent an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time; (3) it did not represent an actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (4) it did not screen as potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event.

**B. Licensee-Identified Violations**

None.

## **REPORT DETAILS**

### **01 INSPECTION SCOPE**

The NRC performed this supplemental inspection to assess the licensee's evaluation of a White performance indicator (PI) in the Residual Heat Removal (RHR) System Unavailability area of the Mitigating Systems cornerstone. The licensee determined that the PI for RHR system unavailability crossed the Green-to-White threshold in the second quarter of 2004.

### **02 EVALUATION OF INSPECTION REQUIREMENTS**

#### **02.01 Problem Identification**

- a. *Determine that the root cause evaluation identifies who (i.e., licensee, self-revealing, or NRC) identified the issue and under what conditions.*

The event was self-revealed when the RHR system unavailability PI was determined to have to crossed the Green-to-White threshold in the second quarter of 2004.

On May 21, 2004, the Emergency Service Water (ESW) 'A' pump failed. This resulted in the unavailability of the RHR 'A' system. In response to the failure of the ESW 'A' pump, the licensee removed the ESW 'B' pump from service in order to perform maintenance. Prior to removing ESW 'B' from service, which rendered RHR 'B' inoperable and unavailable, the licensee established an alternate method of decay heat removal. This method implemented a "feed-and-bleed" strategy that utilized the reactor water cleanup and the condensate and feedwater systems together with the main condenser as a heat sink. The guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, allowed exclusion of RHR unavailability hours only if an NRC-approved alternate method of decay heat removal was available. The licensee considered the feed and bleed method to be an acceptable alternate method of decay heat removal to provide credit for RHR system availability.

Because the NRC had neither reviewed nor approved this alternate decay heat removal method, the resident inspectors questioned the acceptability of this approach and documented the concern as Unresolved Item (URI) 0500440/2004013-05, "Safety-System Unavailability for RHR." The issue was resolved through the NRC's "Frequently Asked Question" (FAQ) process as FAQ 391. On May 19, 2005, the NRC completed its review of FAQ 391 and determined that, "NRC approval means a specific method or methods described in the technical specifications." Because the previously credited feed and bleed alternate decay heat removal method was not a specific method described in Technical Specifications, the licensee re-calculated and re-submitted RHR system unavailability data. The licensee determined that the RHR system unavailability PI crossed the Green-to-White threshold in the second quarter of 2004.

- b. *Determine that the root cause evaluation identifies how long the issue existed and prior opportunities for identification.*



The inspector determined that the root cause evaluation adequately identified how long the issue existed and prior opportunities for identification.

The licensee identified that while the ESW pump failure contributed to RHR system unavailability, the primary root causes for the RHR system unavailability PI crossing the Green-to-White threshold were: (1) that site thresholds and margins to unavailability limits were not consistent with industry standards; and (2) that there was inadequate management of the work process affecting safety system unavailability. The licensee identified contributing causes associated with their corrective action program that included inadequate use of operating experience, poor change management, and a lack of monitoring. The licensee identified that the issue of inadequate management of safety system unavailability was a long-standing issue and was the subject of numerous condition reports (CRs) previously entered into the licensee's corrective action program:

- In 1997, the licensee established a policy of performing online maintenance to the extent possible. In 1999, the licensee reaffirmed this policy and identified that the performance of online maintenance may result in higher than industry average safety system unavailability.
- On July 11, 2000, the licensee identified that the heat removal system unavailability PI crossed the Green-to-White threshold in the second quarter of 2000. To address this issue, the NRC performed Inspection Procedure (IP) 95001, "Inspection For One Or Two White Inputs In A Strategic Performance Area" (IR 05-440/00-13). The licensee identified the impact of inadequate work management on unavailability as a root cause (CR 00-2102).
- On September 11, 2000, the licensee identified through an Independent Safety Engineering Group (ISEG) assessment that the site lacked a clear policy for balancing online maintenance with system unavailability for key safety systems. The ISEG team recommended the development of a policy and guidance document to address the issue (CR 00-2812).
- On September 13, 2000, the licensee identified that the RHR system unavailability PI was close to the NRC Green-to-White threshold of 1.5 percent (CR 00-2816).
- On August 20, 2002, the licensee identified that safety system unavailability PIs were 20 to 40 percent higher than the industry average (CR 02-02854).
- On January 24, 2003, the licensee identified that safety system unavailability was higher than that their industry peers (CR 03-00377).
- On April 5, 2004, the licensee identified that the station lacked a balanced approach to managing safety system unavailability and that this adversely impacted safety system availability (CR 04-01689 and CR 04-01712).
- On April 9, 2004, the licensee identified that the high pressure injection system unavailability PI was close to the NRC Green-to-White threshold and that the

station lacked written guidance to address management of safety system unavailability (CR 04-01844).

- On May 24, 2005, the licensee determined that the RHR system unavailability PI crossed the Green-to-White threshold during the second quarter of 2004. The licensee identified inadequate work management affecting unavailability as a root cause (CR 05-04585).

The inspector noted that the heat removal system and RHR system unavailability White performance indicator events shared essentially the same root cause. The inspector noted the history of problem identification without effective corrective action and identified a finding and an associated non-cited violation (NCV) for the failure to correct a condition adverse to quality in a timely manner.

Introduction: The inspector identified a finding of very low safety significance and a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action." Specifically, despite repeated identification between July 11, 2000, and May 21, 2004, licensee personnel failed to correct a condition of inadequate online work management that resulted in unnecessarily high safety system unavailability.

Description: Between 1997 and 1999 the licensee established and reaffirmed a policy to perform online maintenance to the extent possible. The licensee identified that this policy may lead to increased safety system unavailability.

On July 11, 2000, the licensee identified that the heat removal system unavailability PI crossed the Green-to-White threshold in the second quarter of 2000. The licensee entered the issue into their corrective action program as CR 00-2102. Corrective actions included the development of a policy to outline management expectations and provide site-wide guidance for the management of online maintenance. On September 11, 2000, the licensee identified through an Independent Safety Engineering Group (ISEG) assessment that the site lacked a clear policy for balancing online maintenance with system unavailability for key safety systems. The ISEG team recommended the development of a policy and guidance document to address the issue (CR 00-2812). The corrective action to develop this policy was closed to the corrective action of CR 00-2102, which prescribed the development of an online maintenance management policy. On September 13, 2000, the licensee identified that the RHR system unavailability PI was close to the NRC Green-to-White threshold of 1.5 percent (CR 00-2816). Condition Report 00-2816 documented that a guidance policy was in the process of being developed.

On February 1, 2001, a Divisional Outage Support Desk Guide was created to address the management of online maintenance. The guidance was 10 pages in length and contained three main objectives. The first objective was listed as "Scope is identified in time to meet milestone activities while best utilizing available resources and improving reliability." This objective had 11 goals. The 11th goal stated, "Manage the multiple performance indicators that address system unavailability, e.g. Maintenance Rule, NRC, [Institute for Nuclear Power Operations] INPO/[World Association of Nuclear Operators] WANO, [Monthly Performance Report] MPR, [FirstEnergy Nuclear Operating Company] FENOC, Business Plan, and [System Quarterly Assessment Report] SQAR." The

inspector noted that no further information that expanded on this goal was presented in the guide. Therefore, the inspector concluded that this document provided limited specific guidance or policy on the management of safety system unavailability.

On August 20, 2002, the licensee identified that safety system unavailability PIs were 20 to 40 percent higher than the industry average (CR 02-02854). The CR investigation concluded that the higher than industry average safety system unavailability was an acceptable condition and that no further action was required.

On January 24, 2003, the licensee again identified that safety system unavailability was higher than their industry peers (CR 03-00377). The CR included a cause analysis that concluded that the safety system unavailability deviation between site and peer plants was intentionally established with due management consideration and therefore no further investigation was required.

On April 5, 2004, the licensee identified that the station lacked a balanced approach to managing safety system unavailability and that this adversely impacted safety system availability (CR 04-01689 and CR 04-01712). On April 9, 2004, the licensee identified that the high pressure injection system unavailability PI was close to the NRC Green-to-White threshold and that the station lacked written guidance to address management of safety system unavailability (CR 04-01844). The desk guide that was developed in 2001 was determined to have essentially been discarded as part of a common process procedure system change in 2003.

On May 21, 2004, an ESW pump failed that affected RHR unavailability. The resulting unavailability added to an already high unavailability of RHR, and the RHR system unavailability PI crossed the NRC Green-to-White threshold in the second quarter of 2004 (CR 05-04585). The licensee again identified that general safety system unavailability was higher than the industry average. The licensee identified that primary root causes were: (1) that site thresholds and margins to unavailability limits were not consistent with industry standards; and (2) that there was inadequate management of the work process affecting safety system unavailability. The inspector noted that these causes were effectively the same causes that were identified in 2000 subsequent to the heat removal system unavailability White PI event.

The inspector concluded that between July 11, 2000, and May 21, 2004, the licensee failed to correct the condition of inadequate work management practices leading to unnecessarily high safety system unavailability, which was a performance deficiency.

In the beginning of 2005, the licensee began managing online maintenance with a policy of not exceeding 50 percent of the NRC Green-to-White threshold. On October 10, 2005, the licensee incorporated this policy into procedure. In addition, the licensee incorporated the management of safety system unavailability in the ongoing Perry Phase 2 Performance Improvement Initiative (PII).

Analysis: Between July 11, 2000, and May 21, 2004, despite repeated identification, the licensee failed to correct the condition of inadequate work management practices

leading to unnecessarily high safety system unavailability. The inspector determined that the failure to promptly correct this condition adverse to quality, which adversely affected safety system availability, was a performance deficiency warranting a significance determination.

The inspector concluded that the finding was greater than minor in accordance with Appendix B, "Issue Screening," of Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," dated September 30, 2005. The finding was associated with the mitigating systems cornerstone attribute of equipment performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee's failure to promptly correct a condition adverse to quality resulted in unnecessarily high safety system unavailability and contributed to the RHR system unavailability White PI for the second quarter of 2004. The primary cause of this finding was related to the cross-cutting area of Problem Identification and Resolution, subcategory corrective action, since a condition adverse to quality was not corrected in a timely manner.

The inspector completed a significance determination of this issue using Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated December 1, 2004, of IMC 0609, "Significance Determination Process (SDP)," dated May 19, 2005. The inspector determined that the issue was of very low safety significance in accordance with the Phase 1 screening worksheet because the issue: (1) did not represent an actual loss of safety function of a system; (2) did not represent an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time; (3) did not represent an actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (4) did not screen as potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event.

Enforcement: Appendix B of 10 CFR Part 50, Criterion XVI, "Corrective Action," requires that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to this requirement, between July 11, 2000, and May 21, 2004, despite repeated identification, the licensee failed to promptly correct the condition of inadequate work management practices leading to high safety system unavailability. As a result, in the second quarter of 2004 the RHR system unavailability performance indicator crossed the Green-to-White threshold. Because of the very low safety significance and because the issue has been entered into the licensee's corrective action program (CR 05-04585), the issue is being treated as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy.  
**(NCV 05000440/2005012-01)**

As part of the licensee's corrective actions, the licensee began managing online maintenance with a policy of not exceeding 50 percent of the NRC Green-to-White threshold. On October 10, 2005, the licensee incorporated this policy into procedure. In addition, the licensee incorporated the management of safety system unavailability in the Perry Phase 2 Performance Improvement Initiative.

- c. *Determine that the root cause evaluation documents the plant-specific risk consequences (as applicable) and compliance concerns associated with the issue.*

The inspector determined that the licensee's evaluation adequately documented the plant specific risk consequences and compliance issues associated with the RHR system unavailability reported for the second quarter of 2004.

To address the plant specific risk consequences, on October 18, 2005, the licensee performed a risk analysis to evaluate the actual 1.6 percent RHR unavailability for the second quarter of 2004. The licensee determined that a 1.6 percent RHR unavailability resulted in an increase in core damage frequency of  $3.5\text{E-}07$  and an increase in large early release frequency of  $3.7\text{E-}08$ . The inspector determined that the licensee appropriately categorized this increase in risk as a "very small change" in accordance with NRC Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis," Revision 1.

With regard to compliance concerns associated with RHR system unavailability, on May 22, 2004, the licensee submitted Licensee Event Report (LER) 2004-001 to address the failure of the ESW 'A' pump, which was determined to be of very low safety significance. Prior to removing ESW 'B' for maintenance, the licensee established an alternate method of decay heat removal and credited this to preclude incurring additional RHR unavailability. The resident inspectors challenged the acceptability of the alternate method of decay heat removal used to credit RHR as available. Subsequently, FAQ 391 was submitted to resolve the question. The licensee determined that it had reasonable confidence that its position would be accepted and therefore determined, per guidance contained in NEI 99-02, Revision 2, that it was under no obligation to report the added unavailability. The NRC's resolution of the FAQ did not support the licensee's position of the acceptability of the alternate decay heat removal method and, because this resulted in the PI crossing the Green-to-White threshold, the issue was documented as NCV 05000440/2005006-08, "Unreported Safety-System Unavailability for RHR."

Additional compliance concerns associated with the ESW 'A' pump failure were previously documented as NCV 05000440/2004011-02, "Repetitive Failure of ESW Pump Coupling;" NCV 05000440/2005002-12, "Failure to Implement TS 3.4.10;" and NCV 05000440/2005009-07, "Failure to Implement Procedures to Ensure Proper Reassembly of Division 1 Emergency Service Water Pump."

## 02.02 Root Cause and Extent of Condition

- a. *Determine that the issue was evaluated using systematic method(s) to identify root cause(s) and contributing cause(s).*

The inspector reviewed the licensee's evaluation of the issue and determined that the issue was adequately evaluated using systematic methods to identify root and contributing causes.

On September 23, 2005, the licensee completed a collective review of cause evaluations that addressed the higher than industry average safety system unavailability, including RHR system unavailability (CR 05-04585). The licensee used an event and causal factors charting analysis to reconstruct the history of safety system unavailability issues. The licensee performed a collective review of three previous apparent cause evaluations:

- An apparent cause evaluation, dated October 16, 2004, addressed higher than industry average safety system unavailability (CR 04-01689). The licensee utilized a procedure-based failure-modes-and-effects-tree methodology to determine that: (1) site thresholds and margins for safety system unavailability were not consistent with industry standards; and (2) management of the work process to control safety system unavailability was not at an acceptable level.
- An apparent cause evaluation, dated July 14, 2004, addressed deficiencies in the management of station work (CR 04-01712). The licensee used TapRoot® analysis to determine that standards, policies, and administrative controls needed improvement.
- An apparent cause evaluation, dated May 24, 2004, addressed the inability to manage work performance to control safety system unavailability (CR 04-01844). The licensee used process flow charting and barrier analysis to determine that in-house experience and operating events were not effectively used to prevent problems.

The inspector noted that the September 23, 2005, evaluation of the previously identified root causes, while containing the basic elements normally associated with a formal root cause evaluation, was not conducted as a formal root cause analysis. The licensee determined that the causes were well understood based upon the previous evaluations discussed above which used systematic methods to determine the root cause.

The September 23, 2005, evaluation relied on a collective review of these past evaluations that addressed high safety system unavailability. The inspector noted that the licensee and the NRC had previously identified broad weaknesses in its corrective action program and that the corrective action program was a focus area for improvement in the Perry Phase 2 PII. Because the licensee chose to rely on past corrective action program products although the corrective action program had known weaknesses, the inspector concluded that the licensee had missed an opportunity to review the previously accomplished apparent cause evaluations and determine whether these evaluations adequately identified the issues that resulted in the previous safety system unavailability concerns.

- b. *Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the issue.*

The inspector conducted reviews of licensee documents and interviews with station personnel and determined that the root cause evaluation was conducted to an adequate level of detail commensurate with the significance of the issue.

The collective evaluation of root and contributing causes was of sufficient detail to allow for the identification of multiple root and contributing causes. The evaluation was of sufficient scope to allow for the identification of about 30 individual corrective actions. The inspector also noted that the issue of effective work management was one of the six primary focus areas subject to ongoing review as part the Perry Phase 2 PII.

- c. *Determine that the root cause evaluation included consideration of prior occurrences of the problem and knowledge of prior operating experience.*

The inspector determined that the root cause evaluation included adequate consideration of prior occurrences of the problem and knowledge of prior operating experience.

The inspector noted that the licensee conducted a review of the issue that extended back to 1997. In 1997 the licensee initiated the policy to perform online maintenance to the extent possible. The licensee used event charting to construct a time-line to evaluate prior occurrences that included past unavailability issues. The inspector determined, through interviews with licensee personnel and document reviews, that the licensee benchmarked its work management and system unavailability performance against industry performance, and it incorporated operating experience from industry peers into its evaluation of causes of high safety system unavailability.

- d. *Determine that the root cause evaluation addresses the extent of condition and the extent of cause of the issue.*

The inspector determined that the root cause evaluation adequately addressed the extent of condition and the extent of cause of the issue.

The licensee conducted an extent of condition analysis and determined that the condition of higher than industry average safety system unavailability affected all safety systems monitored by NRC PIs (RHR, high pressure core spray (HPCS), reactor core isolation cooling (RCIC), and emergency alternating current (AC) power). The licensee performed an extent of cause analysis and identified: (1) the inadequate management of PI thresholds applied equally to other systems monitored by industry PIs; (2) the inadequate work management causes extended to other systems and affected work management in general; and (3) contributing causes related to weaknesses in the corrective action program was a generic site problem.

## 02.03 Corrective Actions

- a. *Determine that appropriate corrective actions are specified for each root cause, or that there is an evaluation that no actions are necessary.*

The inspector determined that appropriate corrective actions were specified for each root cause.

The inspector noted that corrective actions to address the causes included:

(1) establishment of a written business policy to manage safety system unavailability to 50 percent of the NRC threshold; and (2) establishment of an online work management procedure that addressed unavailability management.

In addition, the Perry Phase 2 PII addressed the corrective action program and the work management program as two of six primary initiatives subject to ongoing review. The work management initiative included specific performance criteria related to safety system unavailability.

- b. *Determine that the corrective actions have been prioritized with consideration of the risk significance and regulatory compliance.*

The inspector determined that the corrective actions were adequately prioritized with consideration of the risk significance and regulatory compliance.

With the exception of the ongoing Perry Phase 2 PII and corrective action effectiveness reviews, all corrective actions associated with the RHR PI were complete. The licensee started to manage safety system unavailability to 50 percent of the NRC Green-to-White threshold at the beginning of 2005. The inspector determined through document reviews and interviews with station personnel that the licensee understood and considered the risk significance and regulatory compliance aspects of safety system unavailability.

- c. *Determine that a schedule has been established for implementing and completing the corrective actions.*

The inspector determined that an acceptable schedule was established for implementation and completion of corrective actions in accordance with the licensee's corrective action program. With the exception of the ongoing Perry Phase 2 PII and scheduled corrective action effectiveness reviews, the corrective actions were complete.

- d. *Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.*

The inspector determined that adequate qualitative and quantitative measures of success were developed for determining the effectiveness of corrective actions to prevent recurrence.

The licensee had scheduled corrective action effectiveness reviews and incorporated the review of management of safety system unavailability into the Perry Phase 2 PII. The licensee policy of unavailability management to 50 percent of the NRC Green-to-



White threshold was a quantitative criteria. The Perry Phase 2 PII included additional quantitative success criteria for the management of safety system unavailability.

### **03 MANAGEMENT MEETINGS**

#### Exit Meeting Summary

The inspector presented the inspection results to Mr. Richard Anderson and other members of licensee management and staff at the conclusion of the inspection on October 28, 2005. The licensee acknowledged the information presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

R. Anderson, Vice President-Nuclear  
F. von Ahn, General Manager, Nuclear Power Plant Department  
J. Lausberg, Manager, Regulatory Compliance  
T. Lentz, Director, Performance Improvement Initiative  
J. Messina, Manager, Operations  
K. Russell, Regulatory Affairs  
M. Wayland, Maintenance Manager

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

None.

#### Opened and Closed

05000440/2005012-01	NCV	Failure to Promptly Correct Online Work Management Practices that Resulted in Unnecessarily High Safety System Unavailability
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#### Closed

None.

#### Discussed

05000440/2004013-05	URI	Safety System Unavailability for RHR
05000440/2005006-08	NCV	Unreported Safety System Unavailability for RHR
05000440/2004011-02	NCV	Repetitive Failure of ESW Pump Coupling
05000440/2005002-12	NCV	Failure to Implement TS 3.4.10
05000440/2005009-07	NCV	Failure to Implement Procedures to Ensure Proper Reassembly of Division 1 Emergency Service Water Pump

#### Closed

None.

## LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

CR 00-2102; [Reactor Core Isolation Cooling] RCIC Unavailability; dated July 12, 2000  
CR 00-2812; Provide Recommendations from ISEG Regarding Management Aspects; dated December 21, 2000  
CR 00-2816; [Request For Assistance] RFA - ISEG Assessment, RHR Unavailability May Approach Green-to-White Threshold; dated September 13, 2000  
CR 02-02854; Safety System Unavailability Potential Improvements - RFA; dated August 20, 2002  
CR 03-00377; Safety System Unavailability Time (Perry versus Industry Averages); dated January 24, 2003  
CR 04-01689; INPO 2004 AFI ER.1-1 - Safety System Reliability and Availability; dated April 5, 2004  
CR 04-01712; INPO 2004 AFI-ER.7-1- Weaknesses in Implementation of the Work Management System; dated April 5, 2004  
CR 04-01844; [High Pressure Core Spray] HPCS Unavailability Approaching NRC Green-White Unavailability Threshold; dated April 9, 2004  
CR 04-02404; Operating Experience Program/Implementation Issues Identified During Assessment; dated May 12, 2004  
CR 04-02598; ESW Pump A Failure; dated May 21, 2004  
CR 05-00111; Unresolved Item Tracking: Safety System Unavailability for RHR PI; dated January 6, 2005  
CR 05-03568; INPO 2004 AFI OR.2-2 Organization Effectiveness - Shortfalls in Managing Change; dated April 14, 2005  
CR 05-04585; RHR Unavailability NRC Performance Indicator May Potentially Become White; dated May 24, 2005  
CR 05-06351; Tracking of Divisional Outage Improvement Opportunities; dated August 30, 2005  
Department Data Entry - Corrective Actions Logs; dated October 21, 2005  
FAQ Log; dated May 19, 2005  
Divisional Outage Support Desk Guide; Revision 0  
FENOC internal memo; Riverbend Benchmarking; dated July 12, 2004  
LER 2004-001-01; Emergency Service Water Pump Failure; dated May 22, 2004  
Perry Performance Improvement Initiative; Corrective Action Program Implementation Effectiveness; dated September 27, 2005  
Perry Performance Improvement Initiative; Detailed Action and Monitoring Plan; dated April 4, 2005  
Perry Performance Improvement Initiative; Effective Work Management; dated September 22, 2005  
Perry Work Implementation Schedule Week 12, Period 2; dated October 20, 2005  
Safety System Outages and Unplanned Available Hours for October 2005  
PYBP-SITE-0025; Divisional Outage Support Guide; Revision 2  
RHR NRC Unavailability History Chart as of September 2005

Risk Analysis; Risk Impact Due to 1.6 Percent Increase in RHR [Decay Heat Removal] DHR  
Unavailability; dated October 19, 2005  
Survey of Industry Peers; Safety System Reliability/Availability Survey Results;  
dated July 12, 2004

## LIST OF ACRONYMS USED

CFR	<u>Code of Federal Regulations</u>
CR	Condition Report
ESW	emergency service water
FAQ	Frequently Asked Question
FENOC	FirstEnergy Nuclear Operating Company
HPCS	high pressure core spray
IMC	Inspection Manual Chapter
INPO	Institute for Nuclear Power Operations
IR	Inspection Report
ISEG	Independent Safety Engineering Group
LER	Licensee Event Report
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PI	Performance Indicator
RFA	Request for Assistance
RHR	residual heat removal
URI	unresolved item
WANO	World Association of Nuclear Operators