

September 20, 2006

CAL 3-05-001

Mr. L. William Pearce
Site Vice President
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
P. O. Box 97, 10 Center Road, A290
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT
CONFIRMATORY ACTION LETTER (CAL) FOLLOWUP INSPECTION
INSPECTION PROCEDURE (IP) 95002
ISSUES ACTION ITEM EFFECTIVENESS REVIEW
NRC INSPECTION REPORT 05000440/2006014

Dear Mr. Pearce:

The purpose of this letter is to provide you with Inspection Report (IR) 05000440/2006014, detailing the results of a Confirmatory Action Letter (CAL) Followup inspection in the area of IP 95002 Issues. During this inspection, we assessed the effectiveness of the actions that you completed to address previous IP 95002 and IP 95003 inspections. You and other members of your staff attended the August 15, 2006, public exit meeting held at the Quail Hollow Resort in Painesville, Ohio, during which the results of this CAL followup inspection activity were presented. A summary of the public meeting was documented in a letter to you dated August 18, 2006.

As a result of poor performance, the Nuclear Regulatory Commission designated the Perry Nuclear Power Plant as a Multiple/Repetitive Degraded Cornerstone column facility in the NRC's Action Matrix in August 2004. As documented in followup IP 95003 Supplemental Inspection Report 55000440/2005003, with regard to the NRC's review of issues associated with a previous IP 95002 inspection, the NRC determined that actions to address maintenance procedure adequacy and essential service water (ESW) pump failures were still in progress at the end of the IP 95003 inspection. In addition, the NRC identified that one of your corrective actions to address the verification of the quality of ESW pump work was inadequate. Also, actions to address training were still in progress at the end of the inspection. In this case, corrective actions to address the issue had not been timely and at the conclusion of the IP 95003 inspection, had not yet been implemented.

By letters dated August 8, 2005, and August 17, 2005, you responded to the findings and observations detailed in our IP 95003 supplemental inspection report. As discussed in these letters, the Perry management team reviewed the achievements realized by your Performance Improvement Initiative (PII), NRC findings documented in the IP 95003 supplemental inspection report, and the conclusions from various assessments, and developed updates to the PII. The Perry management team restructured the PII into the Phase 2 PII, which contained six new initiatives with the overall purpose of implementing lasting actions to improve the overall performance at the Perry Nuclear Power Plant. These actions included actions to address the issues associated with the previous IP 95002 inspection that were identified during the IP 95003 inspection.

On March 14, 2006, the NRC completed a CAL Followup Inspection in the IP 95002 Issues area that reviewed selected commitments and action items described in the Perry Phase 2 PII Detailed Action and Monitoring Plan (DAMP) and your August 8 and August 17, 2005, letters.

The NRC concluded that during this previous inspection that you satisfactorily implemented the commitments and action items that were reviewed. Notwithstanding this overall conclusion, the NRC also identified some cases where your implementation of these actions was weak, which potentially impacted your overall ability to effectively resolve these issues. A complete discussion of the findings and other observations from this inspection is documented in NRC Inspection Report 50-440/2006007.

The purpose of this inspection was to review the overall effectiveness of your actions to address the IP 95002 Issues area and determine whether any additional inspection in this area beyond that prescribed by the Reactor Oversight Process (ROP) baseline inspection program is required. As such, the inspection objectives were to: (1) Determine whether your corrective actions to address maintenance procedure adequacy issues were effective; (2) Determine whether your corrective actions to address emergency service water (ESW) pump coupling assembly concerns were effective; and (3) Determine whether your corrective actions to address deviations from training in stressful circumstances were effective.

In the area of Maintenance Procedure Adequacy, no findings of significance were identified and improvements in this area continue to be realized. However, we were not able to fairly assess the overall effectiveness of your corrective actions in addressing this area due to an ongoing and currently incomplete supplemental procedure review effort that was initiated following our previous maintenance procedure review inspection. In addition, we identified two maintenance procedure revision process vulnerabilities that we concluded could represent a challenge to your ability to sustain your improvements in this area.

In the area of ESW Pump Coupling Assembly Concerns, no findings of significance were identified and we concluded that your corrective actions have been effective. In particular, you have established an adequate Quality Control Inspection Point Assignment Program and have effectively implemented this program.

In the area of Training Deviations in Stressful Situations, no findings of significance were identified and we concluded that your corrective actions have been effective. In particular, our inspection results indicate that maintenance personnel understand the tools available to them to address this area and have demonstrated the willingness to exercise these tools when necessary. In addition, you have established tools to monitor and trend declining performance to ensure the continued effectiveness of your actions.

In addition, your corrective actions to address human performance weaknesses associated with maintenance procedure implementation that were identified during a previous inspection were also reviewed. During observed training sessions, pre-job briefings, and in-field maintenance activities during this inspection, some human performance weaknesses continued to be identified. Although these weaknesses were not considered to be significant and your efforts in this area appear to have resulted in improved performance, as reflected in human performance error trending data, your attention to this area continues to be warranted. We plan to review your overall effectiveness in addressing this issue during the upcoming Human Performance Action Item Effectiveness inspection scheduled for October 2006.

Your staff should carefully consider the issues identified in this report and ensure the implemented corrective actions, individually and collectively, will support the sustainability of improving performance at the station.

You are requested to respond within 30 days of the date of your receipt of this letter. Your response should describe the specific actions that you plan to take to address the issues raised during this inspection. In particular, if you intend to or have revised your planned actions as a result of the observations in this report, please describe for us the changes you have made or intend to make and your basis for those changes.

The NRC will continue to provide increased oversight of activities at your Perry Nuclear Power Plant until you have demonstrated that your corrective actions are lasting and effective. Consistent with Inspection Manual Chapter (IMC) 0305 guidance regarding the oversight of plants in the Multiple/Repetitive Degraded Cornerstone column of the NRC's Action Matrix, the NRC will continue to assess performance at Perry and will consider at each quarterly performance assessment review the following options: (1) declaring plant performance to be unacceptable in accordance with the guidance in IMC 0305; (2) transferring the facility to the IMC 0350, "Oversight of Operating Reactor Facilities in a Shutdown Condition with Performance Problems" process; and (3) taking additional regulatory actions, as appropriate. Until you have demonstrated lasting and effective corrective actions, Perry will remain in the Multiple/Repetitive Degraded Cornerstone column of the NRC's Action Matrix.

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

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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 05000440/2006014
w/Attachments:

1. Supplemental Information
2. Perry Performance Background
3. Perry IP 95003 Inspection Results

cc w/encl: G. Leidich, President and Chief Nuclear Officer - FENOC
J. Hagan, Senior Vice President of Operations and Chief
Operating Officer - FENOC
D. Pace, Senior Vice President, Fleet Engineering - FENOC
J. Rinckel, Vice President, Fleet Oversight
Director, Site Operations
Director, Regulatory Affairs
Manager, Fleet Licensing
Manager, Site Regulatory Compliance
D. Jenkins, Attorney, FirstEnergy
Public Utilities Commission of Ohio
Ohio State Liaison Officer
R. Owen, Ohio Department of Health

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Mark A. Satorius, Director
Division of Reactor Projects

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 Manager, Site Regulatory Compliance
 D. Jenkins, Attorney, FirstEnergy
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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-440

License No: NPF-58

Report No: 05000440/2006014

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Perry Nuclear Power Plant

Location: 10 Center Road
Perry, Ohio 44081

Dates: July 17 through August 15, 2006

Inspectors: D. Smith, Lead Inspector, Project Engineer, Region III
A. Sabisch, Resident Inspector - Catawba
D. Jones, Resident Inspector - H.B. Robinson

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

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EXECUTIVE SUMMARY

The purpose of this inspection was to review the overall effectiveness of the licensee's actions to address the IP 95002 Issues area and determine whether any additional inspection beyond that prescribed by the Reactor Oversight Process (ROP) baseline inspection program is required in this area.

As such, the inspection objectives were to:

- Determine whether licensee corrective actions to address maintenance procedure adequacy issues were effective.
- Determine whether licensee corrective actions to address (ESW) pump coupling assembly concerns related to the selection of quality control (QC) hold points were effective.
- Determine whether licensee corrective actions to address operator deviations from training during stressful situations were effective.

In the area of Maintenance Procedure Adequacy, no findings of significance were identified and the inspectors concluded that improvements in this area continued to be realized. However, the inspectors determined that, overall, the licensee's effectiveness in addressing this area was indeterminate based upon the following issues:

- At the end of the inspection, of 118 procedures that were within the scope of a supplemental maintenance procedure review effort, only one had been reviewed and approved. As a result, a sufficient number of procedures were not available for the inspectors to review to determine whether corrective actions to address this area had been effective.
- The inspectors identified two maintenance revision process vulnerabilities that potentially challenged the licensee's ability to sustain improvement efforts in this area. The first maintenance procedure revision process vulnerability involved the performance of procedures in the field that had been previously identified as deficient. A second maintenance procedure process vulnerability concerned the exceptions to procedure guidance and a management expectation that procedures steps be accomplished in the order prescribed by the procedure.

In the area of ESW Pump Coupling Assembly Concerns, no findings of significance were identified and the inspectors concluded that the licensee's corrective actions had been effective. In particular, the inspectors concluded that the licensee had established an adequate QC Inspection Point Assignment Program; had properly assigned QC inspection hold points to all work order packages that were reviewed; and had conducted an adequate self-assessment of the QC Inspection Point Assignment Program.

In the area of Training Deviations in Stressful Situations, no findings of significance were identified and the inspectors concluded that the licensee's corrective actions had been effective. In particular, the inspectors concluded that the licensee had implemented human performance

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tools that have been effective in resolving concerns related to pushback. The enhancement to several of the licensee's existing human performance tools, such as the training and observation programs, indicated that maintenance personnel understood the pushback tools and have demonstrated the willingness to pushback when necessary. The structure of pre-job briefings demonstrated that enhancements to the existing tools were effective in allowing the workers to raise concerns and properly address those concerns. In addition, the licensee's ability to monitor and trend declining performance in the area of pushback and other areas of human performance should continue to ensure the licensee's effectiveness in this area.

In addition, the inspectors reviewed licensee corrective actions to address human performance weaknesses associated with maintenance procedure implementation that were identified during a previous inspection. These weaknesses included procedure use and adherence, placekeeping, marking of procedure steps as not applicable (N/A), and the identification and communication of procedure-related issues to management supervision. During observed training sessions, pre-job briefings, and in-field maintenance activities, the inspectors continued to identify human performance weaknesses. Although these human performance weaknesses were identified, they were not considered to be significant and licensee efforts in this area appear to have resulted in improved performance as reflected in human performance error trending data.

SUMMARY OF FINDINGS

IR 05000440/2006014; 7/17/2006 - 8/15/2006; Perry Nuclear Power Plant; Confirmatory Action Letter (CAL) Followup Inspection - IP 95002 Issues Action Item Effectiveness Review.

This report covers a 2-week period of supplemental inspection by resident and region-based inspectors. No findings of significance 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.

G. NRC-Identified and Self-Revealed Findings

None.

B. Licensee-Identified Violations

None.

REPORT DETAILS

1.0 Background

As a result of poor performance, in August 2004 the Nuclear Regulatory Commission (NRC) designated the Perry Nuclear Power Plant (PNPP), owned and operated by FirstEnergy Nuclear Operating Company (FENOC), as a "Multiple/Repetitive Degraded Cornerstone Column" facility in the NRC's Action Matrix. Accordingly, a supplemental inspection was performed in accordance with Inspection Procedure (IP) 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input."

The scope of the IP 95003 inspection included the review of licensee actions to address deficiencies identified during a previous IP 95002 inspection. In particular, the NRC reviewed the licensee's root cause and corrective actions to address the areas of procedure adequacy, procedure adherence, and training deficiencies identified in a previous IP 95002 inspection; as well as the problem identification, root cause review, and corrective actions to address repetitive emergency service water (ESW) pump coupling failures.

With regard to the NRC's review of issues associated with the previous IP 95002 inspection, the NRC determined that actions to address procedure adequacy and ESW pump failures were still in progress at the end of the IP 95003 inspection. The team identified that one of the licensee's corrective actions to address the verification of the quality of ESW pump work was inadequate (NCV 50-440/2005003-17). In addition, in light of the continuing problems in human performance and the impact on procedure adherence, the team concluded that actions to address procedure adherence had not been fully effective. Finally, actions to address training were also still in progress at the end of the inspection. In this case, the licensee's corrective actions to address this issue had not been timely and at the conclusion of the IP 95003 inspection, had not yet been implemented. As a result, the NRC concluded that the open White findings associated with the IP 95002 inspection would continue to remain open pending additional licensee actions and the NRC's review of those actions. Additional details regarding these White findings is discussed in Attachment 2, "Perry Performance Background," of this report.

By letters dated August 8, 2005, "Response to NRC Inspection Procedure 95003 Supplemental Inspection, Inspection Report 05000440/2005003," and August 17, 2005, "Corrections for Response to NRC Inspection Procedure 95003 Supplemental Inspection, Inspection Report 05000440/2005003," Perry Nuclear Power Plant (PNPP) responded to the inspection results discussed in the NRC's IP 95003 supplemental inspection report. A complete summary of all of the inspection results is discussed in Attachment 3, "Perry IP 95003 Inspection Results," of this report.

By letter dated September 30, 2004, FirstEnergy advised the NRC that actions were underway to improve plant performance. To facilitate these performance improvements, FirstEnergy developed the Perry Performance Improvement Initiative (PII). The PNPP leadership team reviewed the achievements realized by the PII, the results of the NRC's

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IP 95003 supplemental inspection activities, and the conclusions from various additional assessments, and developed updates to the Perry PII. The Perry leadership team restructured the PII, referred to as the Phase 2 PII, into the following six initiatives:

- Corrective Action Program Implementation Improvement
- Excellence in Human Performance
- Training to Improve Performance
- Effective Work Management
- Employee Engagement and Job Satisfaction
- Operational Focused Organization

The purpose of the Phase 2 PII, as described in the licensee letters, was to implement lasting actions to improve the overall performance at the Perry Nuclear Power Plant.

By letter dated September 28, 2005, the NRC issued a Confirmatory Action Letter (CAL) to Perry which acknowledged the NRC's understanding of FENOC's commitment to make sustained improvement to address issues in the areas of Human Performance, Corrective Action Program Implementation, Emergency Preparedness, and Inspection Procedure 95002 Issues.

On March 14, 2006, the NRC completed a CAL Followup Inspection in the IP 95002 Issues area that reviewed selected commitments and action items described in the Perry Phase 2 PII Detailed Action and Monitoring Plan (DAMP) and the licensee's August 8 and August 17, 2005, letters. The specific purposes of this inspection were to: (1) Determine whether licensee corrective actions to address maintenance procedure adequacy issues were adequate, (2) Determine whether licensee corrective actions to address emergency service water (ESW) pump coupling assembly concerns were adequate, and (3) Determine whether licensee corrective actions to address training issues were adequate.

Overall, the NRC concluded that the licensee satisfactorily implemented the commitments and action items that were reviewed. Notwithstanding this overall conclusion, the NRC also identified some cases where the licensee's implementation of these actions was weak, which potentially impacted the overall ability to effectively resolve these issues. A complete discussion of the findings and other observations from this inspection is documented in NRC Inspection Report 50-440/2006007.

2.0 Inspection Scope

The purpose of this inspection was to review the overall effectiveness of the licensee's actions to address the IP 95002 Issues area and determine whether any additional inspection beyond that prescribed by the ROP baseline inspection program is required.

As such, the inspection objectives were to:

- Determine whether licensee corrective actions to address maintenance procedure adequacy issues were effective.

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- Determine whether licensee corrective actions to address (ESW) pump coupling assembly concerns related to the selection of quality control (QC) hold points were effective.
- Determine whether licensee corrective actions to address operator deviations from training during stressful situations were effective.

To accomplish these objectives, the following activities were accomplished:

Maintenance Procedure Adequacy

Issues associated with adequacy of maintenance procedures directly contributed to the two open White findings in the Mitigating Systems cornerstone that resulted in Perry being categorized within the Multiple/Repetitive Degraded Cornerstone column of the NRC's Action Matrix. To address maintenance procedure adequacy issues, the licensee identified commitments and actions items in the Phase 2 PII. The following specific commitment was identified:

- Commitment Item 1.a: "To date, one hundred eight (108) of the one hundred eighteen (118) procedures have been updated and issued. The remaining maintenance procedures have been updated and are currently going through the owner's review and acceptance review process."

During the IP 95002 Issues Action Item Implementation inspection, the team determined that this commitment had been satisfactorily implemented. The team determined that the licensee completed revisions to the initial set of 118 procedures and planned additional revisions to these procedures, as needed. Based upon the results of the IP 95002 Issues Action Item Implementation inspection, the licensee planned a supplemental procedure review effort to re-review all 118 maintenance procedures.

During this inspection, the inspectors determined whether the licensee's actions to address the maintenance procedure adequacy area were effective. To perform this assessment, the inspectors reviewed the results of the licensee's supplemental maintenance procedure review effort, observed maintenance activities conducted in the field, and reviewed documentation associated with maintenance activities that were completed prior to the inspection.

In addition, the inspectors observed training sessions designed to address human performance weaknesses associated with maintenance procedure implementation that were identified during the IP 95002 Issues Action Item Implementation inspection. These weaknesses included procedure use and adherence, placekeeping, the marking of procedure steps as not applicable (N/A), and the identification and communication of procedure-related issues to management supervision. Interviews were also conducted with maintenance workers and supervisors to assess the consistency of their understanding of the expectations for the use and adherence to procedures, the performance of procedure placekeeping, the marking of procedure steps as N/A, and the identification and communication of procedure-related issues to management

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supervision. The team assessed the effectiveness of the licensee's actions in addressing these weaknesses.

ESW Pump Coupling Assembly Concerns

Issues associated with the adequacy of maintenance procedures directly contributed to a White finding associated with ESW pump re-assembly. In particular, quality control (QC) inspection hold points were identified to have not been appropriately established for work activities associated with ESW pump shaft couplings.

To address this issue, the licensee identified the following specific commitments in the Phase 2 PII that were reviewed during the IP 95002 Issues Action Item Implementation inspection:

- Commitment Item 1.b: "CA [Corrective Action] 05-03655-01 is to revise Nuclear Quality Assurance Instruction (NQI)-1001, 'QC Inspection Program Control,' to specify a method by which classification can be established for additional inspection attention items that have experienced repeat failures. This method will include consideration of failure analysis, the risk-significance of the item, and the probability of failure occurrence in determining the extent of inspection activity."
- Commitment Item 1.c: "CA 05-03655-03 is to revise General Mechanical Instruction (GMI)-0039, 'Disassembly/Re-assembly of Divisions I and II Emergency Service Water Pumps,' and GMI-040, 'Disassembly/Re-assembly of Division III Emergency Service Water Pump,' to include QC inspection points for work activities associated with pump shaft couplings, as specified by QC."

During the IP 95002 Issues Action Item Implementation inspection, the team confirmed that the licensee had added appropriate QC hold points to the coupling reassembly sections of ESW pump rebuild procedures GMI-0039 and GMI-0040.

The IP 95002 Issues Action Item Implementation inspection team also confirmed that the licensee implemented two major revisions to NQI-1001. The team reviewed the licensee's most recent revision to NQI-1001 (Revision 5) and concluded that NQI-1001, Revision 5, appropriately incorporated the consideration of failure history, risk significance, and failure probability in assigning QC inspection hold points.

During this inspection, the inspectors determined whether the licensee's actions to address this area were effective. To perform this assessment, the inspectors reviewed completed and planned work orders (WOs) to determine whether QC inspection points had been appropriately assigned; independently assessed the QC Inspection Point assignment program; and compared that assessment to a licensee self-assessment of the program.

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Training Deviations in Stressful Situations

As discussed in the IP 95003 supplemental inspection report, a previous IP 95002 supplemental inspection report identified that barriers to prevent events were not always utilized in stressful situations. During the IP 95003 inspection, a finding was identified when licensee personnel failed to correct, in a timely manner, the issue of operator deviation from training in stressful situations.

To address this issue, the licensee identified the following actions in their August 8 and August 17, 2005, letters that were reviewed during the IP 95002 Issues Action Item Implementation inspection:

- Review the corrective action of "...development of proper planning for work management to ensure strict compliance of job planning to eliminate misdirection during conduct of the job," described in Perry letter PY-CEI/NRR-2897L dated August 17, 2005.
- Review the corrective action of "...plant manager to discuss 'push back' in the daily plant updates. This discussion will promote a challenging attitude from the employees," described in Perry letter PY-CEI/NRR-2897L dated August 17, 2005.
- Review the corrective action of "...new human performance tools have been rolled out which reinforce use of human performance during stressful times. These tools are discussed in the following human performance procedures: (1) NOBP [Nuclear Operating Business Practice]-LP-2601, 'Human Performance Program'; (2) NOBP-LP-2603, 'Human Performance Tools and Verification Practices'; (3) NOBP-LP-2604, 'Job Briefs'; and (4) NOP [Nuclear Operating Procedure]-LP-2601, 'Procedure Use and Adherence.'"

During the IP 95002 Issues Action Item Implementation inspection, the team confirmed that the licensee adequately implemented the actions identified above.

During this inspection, the inspectors determined whether the licensee's actions to address this area were effective. To perform this assessment, the inspectors attended pre-job briefings prior to maintenance activities; reviewed training material that had been developed to train the staff on the new tools and expectations; observed training sessions designed to enhance good human performance behaviors; and reviewed other documentation to identify any instances in which licensee personnel were not willing to "push back" during plant activities. In addition, the inspectors reviewed the licensee's programs that observed, assessed, and tracked the behavior and performance of licensee personnel. Interviews were also held with maintenance workers and supervisors to determine whether the new expectations had been effectively communicated by management supervision and internalized by the staff.

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3.0 Maintenance Procedure Adequacy

3.1 Maintenance Procedure Adequacy - In-field Observations

a. Inspection Scope

The licensee's May 9, 2006, response to the IP 95002 Issues Action Item Implementation inspection (ML061360218) documented that corrective actions to address the technical and administrative deficiencies identified during the review of revised maintenance procedures would include a supplemental review effort for all 118 maintenance procedures. During this inspection, the inspectors reviewed the licensee's progress and results of this effort.

During this inspection, the inspectors also observed maintenance activities that were associated with the 118 maintenance procedures that were in various stages of the supplemental review effort. In particular, the inspectors observed the in-field implementation of the maintenance procedures and determined whether the procedures could be performed as written; incorporated appropriate technical information, such as vendor manual guidance, where appropriate; and adequately accomplished the prescribed maintenance activity.

In addition, the inspectors observed training sessions designed to address human performance weaknesses associated with the implementation of maintenance procedures and assessed the effectiveness of the licensee's actions in addressing these weaknesses. Interviews were also conducted with maintenance workers and supervisors to assess the consistency of their understanding of expectations for the use and adherence to procedures, the performance of procedure placekeeping, the marking of procedure steps as not applicable (N/A), and the identification and communication of procedure-related issues to management supervision.

b. Observations and Findings

b.1 Supplemental Procedure Review Effort

The licensee's supplemental maintenance procedure review approach consisted of two independent elements; a craft review by maintenance personnel and a technical review by engineering personnel. Following both of these reviews, the procedure review effort then followed the routine procedure revision process as delineated in NOP-SS-3001, "Procedure Review and Approval," Revision 9, and site specific validation procedure, Perry Administrative Procedure (PAP)-0550.3, "Procedure Validation," Revision 1. All 118 maintenance procedures required validation using the guidance in PAP-0550.3.

The inspectors determined that licensee personnel accomplished these reviews without using a pre-established completion schedule. This approach was not successful in completing this effort in a timely manner and resulted in the issuance of only one procedure at the end of this inspection.

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All of the remaining procedures were in various stages of the supplemental procedure review process. Subsequently, based on discussions with the inspectors, licensee personnel developed a schedule that prescribed that 70 of these procedures be completely reviewed by October 23, 2006, and that all 118 maintenance procedures be reviewed by the end of the year.

During the review of the licensee's supplemental maintenance procedure review effort, the inspectors identified two maintenance procedure revision process vulnerabilities. These process vulnerabilities involved the performance of procedures in the field that had been previously identified as deficient, and the incorporation of exceptions to procedural guidance and management expectations that procedure steps be completed in the order they are specified. Both of these issues had the potential to adversely affect the licensee's ability to sustain improvements in the maintenance procedure adequacy area.

The first maintenance procedure revision process vulnerability involved the performance of procedures in the field that had been previously identified as deficient in a document change request (DCR), condition report (CR), or on a marked-up hard copy of the procedure. In this case, the inspectors identified that licensee personnel had not established any mechanism to inform maintenance supervisors and workers of these identified procedure issues so that they could be discussed during pre-job briefings. In addition, in a number of cases, licensee personnel had not expeditiously addressed the procedure deficiencies nor placed the procedures on "hold." As a result, the inspectors identified that in some cases, workers had performed maintenance activities in the field using procedures that had been previously identified as requiring revision, but which had not been revised. In addressing this issue, on an interim basis, licensee personnel planned to insert "pink sheets" in work order (WO) packages to alert maintenance personnel to the issue and later planned to add a requirement for maintenance personnel to check for open DCRs for a procedure prior to performing the procedure in the field. In addition, because several of the deficient procedures were used in the maintenance personnel training program, the licensee established processes to ensure that procedure revisions were appropriately incorporated into the training program.

A second maintenance procedure process vulnerability concerned the exceptions to procedural guidance and management expectations that procedure steps be accomplished in the order prescribed by the procedure. In one case, the inspectors identified a statement in several procedures that provided the provision for maintenance personnel, at the discretion of the first line supervisor, to perform procedure steps out-of-sequence. This statement had originally been provided in 69 of the 118 maintenance procedures. The licensee's ongoing supplemental maintenance procedure review effort had eliminated this statement from all but 2 of the 69 procedures. However, due to difficulties in performing several procedures as written, licensee personnel re-incorporated this statement into 4 of the procedures. Licensee personnel initiated condition report (CR) 06-03307 to enter this issue into their corrective action program. In a second case, the inspectors identified that PAP-0905, "Work Order Process," Revision 24, which allowed maintenance personnel to perform steps in any order unless otherwise specified in the work order package, was in direct conflict with corporate procedure NOP-WM-1001, "Order Planning Process," Revision 6.

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b.2 Issues Identified During In-Field Observations

During this inspection, the inspectors observed 8 maintenance activities in the plant that were associated with the 118 maintenance procedures. The following issues, that were considered minor in nature because no actual adverse consequences resulted, were identified:

General Electrical Procedure (GEI)-0136 - ABB Power Circuit Breakers 15KV Type 15HK1000 Maintenance, Revision 16

On July 18, 2006, the inspectors observed electrical maintenance personnel install auxiliary contact switches for an ABB circuit breaker through the implementation of WO 200087890, "13.8KV to 480V XFMR and GEI-0136, ABB Power Circuit Breakers 15KV Type 15HK1000 Maintenance."

During this observation, the inspectors identified that Attachment 5, "Repair, Refurbishment, and Replacement of Type L2 Auxiliary Switches," of GEI-0136, did not provide adequate instructions for the replacement of the auxiliary switch. In addition, the procedure was still inadequate after the licensee utilized Engineering Evaluation Request (EER) 600301236, "Could Not Adjust Switch for L2103," to address this deficiency. Subsequently, the inspectors determined that these same procedure deficiencies were also applicable to GEI-135, "ABB Power Circuit Breakers 5KV Types 5HK250 & 5HK350 Maintenance," Revision 13. The inspectors also identified that the WO incorrectly sequenced the work activities. Licensee personnel generated CR 06-03256 to enter these issues into the corrective action program.

GEI-0009 - ABB Low Voltage Power Circuit Breakers Types K-600 and K-600s, Revision 18

On July 20, 2006, the inspectors observed the racking in of an ABB circuit breaker associated with the "A" Building Heating Hot Water Pump through the implementation of WO 200087860. The breaker had been refurbished in accordance with GEI-0009. The inspectors identified that although the WO directed electricians to measure voltage across the open and closed contacts for an alarm, the WO did not provide an expected voltage value or acceptance criteria. Licensee personnel generated CR 06-03337 to enter this issue into the corrective action program.

General Maintenance Instruction (GMI)-0073 - V-Belt and Sheave Maintenance, Revision 8

On July 18, 2006, while observing the use of GMI-0073 during a hands-on training session, the inspectors identified a number of deficiencies with the procedure. For example, GMI-0073 did not specify that a particular step only needed to be performed when a pulley was replaced. As a result, workers either recorded meaningless data or stopped work to obtain guidance from maintenance supervision. The inspectors also determined that although this deficiency was originally identified by maintenance personnel in July 2005, the procedure had not been revised nor was feedback provided

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to maintenance personnel. In addition, while reviewing the procedure against the applicable vendor manuals, the inspectors identified that although a section in the procedure was found to contain guidance for tensioning drive belts, the guidance was only applicable to units that contained multiple belts. The inspectors' review of the vendor manual also identified that shaft damage could occur if this section was applied to single-belt units. The inspectors determined that although licensee personnel had identified this issue in March 2006, the procedure had not been revised and licensee personnel had not provided feedback to the maintenance staff.

b.3 Effectiveness in Addressing Previously Identified Human Performance Weaknesses

During observed training sessions, pre-job briefings, and in-field maintenance activities, the inspectors continued to identify human performance weaknesses.

The following human performance issues that were identified by the inspectors during observed licensee maintenance activities were considered to be minor in nature:

Performance of GMI-0021 - General Torquing; Revision 8

On July 18, 2006, the inspectors observed mechanical maintenance personnel perform WO 200144551, which involved work on a scaffold to replace an air compressor relief valve.

The mechanics were observed to be working on a scaffold that did not have a mid-rail installed on one of the four sides of the scaffold, as required. In addition, although workers on scaffolds were required to use lanyards on tools because toeboards were not installed on the scaffold, the workers did not consistently meet this requirement. Tools from a bucket, which had been lanyarded, were placed on a platform without a lanyard. As part of their immediate corrective actions, licensee personnel installed the missing mid-rail and inspected all plant scaffolding and verified that no similar problems existed. Licensee personnel also generated CR 06-03193 and CR 06-03217 to enter this issue into the corrective action program.

Performance of GEI-001 - Performing Insulation Resistance Checks; Revision 9

On July 19, 2006, the inspectors observed the performance of WO 200166718, which involved the megging of several motors using GEI-001 and Preventive Maintenance Instruction (PMI)-0098, "Radwaste Crane Preventive Maintenance," Revision 3. The inspectors noted that the electricians did not stop and contact maintenance supervision when they were unable to perform step 5.5.8 of PMI-0098. The step contained substep 5.5.8.1, which could not be performed because the step was unrelated to the mechanical maintenance task. In addition, the attachment to the PMI was not conducive for placekeeping. Licensee personnel generated CR 06-03247 to enter this issue into the corrective action program.

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Performance of Standard Operating Instruction (SOI)-R22 - Metal Clad Switchgear 5-15KV, Revision 17

On July 20, 2006, during the performance of WO 200134219, the inspectors observed that electricians failed to properly verify that a room adjacent to the 4160 Volt bus was not occupied by licensee personnel prior to installing a grounding truck in a cubicle on the 4160 volt bus. Personnel were required to remain 20 feet away during this installation activity per SOI-R22. Licensee personnel generated CR 06-03249 to enter this issue into the corrective action program.

Maintenance Personnel Knowledge of “Critical Steps” During Pre-Job Briefings

In addition, the inspectors noted varying responses during pre-job briefings when maintenance personnel discussed the human performance aspects associated with the performance of critical steps. This inconsistency in responses was likely due, in part, to a recent revision to the definition of “critical step.” The licensee revised the definition of a critical step as contained in PAP-0500, “Perry Technical Procedure Writer’s Guide,” Revision 2. This definition was more narrowly focused than the definition in the previous guidance in MAI-0507, “Maintenance Procedures Writer’s Guide,” Revision 0.

Although these examples of human performance weaknesses were identified, licensee efforts in this area appeared to have resulted in improved performance as reflected in human performance error trending data. This improvement was likely due, in part, to procedure adherence training, enhancements in the conduct of pre-job briefings (discussed in Section 5.1), and the use of dynamic procedure adherence training.

3.2 Maintenance Procedure Adequacy - Records Review

a. Inspection Scope

During the IP 95002 Issues Action Item Implementation inspection, the team determined that the licensee completed revisions to the initial set of 118 procedures and planned additional revisions to these procedures, as needed.

During this inspection, the inspectors reviewed documentation associated with maintenance activities conducted in the field prior to this inspection that were associated with a sample of the original 118 maintenance procedures that had been revised.

In particular, through a review of the documentation associated with completed maintenance activities, the inspectors determined whether the revised procedures, which were in various stages of the supplemental procedure review effort, could be performed as written; incorporated appropriate technical information, such as vendor manual guidance; and adequately accomplished the prescribed maintenance activity. In addition, the inspectors determined whether maintenance personnel initiated actions, through the use of station tools, to identify procedure weaknesses or deficiencies that were encountered while performing the procedures.

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b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified.

The inspectors reviewed 18 work packages that had been completed during the first 6 months of 2006. The results of this review indicated that the procedures were adequate and that maintenance personnel had properly completed the maintenance activities. However, during the reviews of the work order packages, the inspectors noted some human performance deficiencies, such as incorrect annotation of the completion of steps, inappropriate marking of procedure steps as not applicable (N/A), and inadequate placekeeping. Similar deficiencies were documented in NRC Inspection Report 05000440/2006007 and in Section 3.1 of this report.

These human performance deficiencies did not adversely affect the operability of any equipment. However, the inspectors concluded that first line supervision had not provided adequate oversight with respect to re-enforcing management's expectations regarding the use of human performance tools. These additional examples of human performance problems indicated that management attention was still warranted in this area.

The examples provided below were representative of the types of human performance weaknesses generally noted by the inspectors.

PMI-0075 - Division 3 HPCS [High Pressure Core Spray] Diesel Generator Air Starting Solenoids and Relay Valves Replacement; Revision 4

The inspectors determined that placekeeping was inadequate because some of the steps in PMI-0075 that were completed were not annotated as having been completed using placekeeping tools.

PMI-0030 - Maintenance of Limitorque Valve Operators; Revision 12

During a review of WO 200053854, the inspectors identified that workers used all available options for annotating that procedure steps had been completed. For example, Steps 5.1.3.1 and 5.1.3.2 of PMI-0030 were each circled and then slashed through, initialed, and marked as "N/A." As a result, the inspectors could not determine if the steps had been performed by the workers.

Corrective Maintenance Instruction CMI-0007 - Maintenance of Limitorque MOV [Motor-Operated Valve] Type SMB-000; Revision 8

During a review of WO 200123164, the inspectors identified that workers failed to properly implement placekeeping tools because substeps of several sections of CMI-0007 were not circled and initialed or lined-out. The corresponding substeps on the data sheet indicated that all the substeps had been performed by the workers.

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3.3 Maintenance Procedure Adequacy - Overall Assessment

a. Inspection Scope

Based upon the results of the review of the licensee's supplemental procedure review effort, observations of maintenance activities conducted in the plant during this inspection, and a review of documentation associated with maintenance activities, the inspectors completed an overall assessment of the licensee's actions to address the Maintenance Procedure Adequacy area.

b. Observations and Findings

The inspectors concluded that no findings of significance were identified and that based upon the maintenance procedures and maintenance records that were reviewed during the inspection, and the maintenance activities observed in the field, that improvements in this area continued to be realized. However, the inspectors determined that, overall, the licensee's effectiveness in addressing the Maintenance Procedure Adequacy area was indeterminate based upon the following issues:

- At the end of the inspection, of the 118 procedures that were within the scope of the licensee's supplemental maintenance procedure review effort, only one had been reviewed and approved. As a result, a sufficient number of procedures were not available for the inspectors to review to determine whether corrective actions to address this area had been effective.
- The inspectors identified two maintenance revision process vulnerabilities that challenged the licensee's ability to sustain improvement efforts in this area. The first maintenance procedure revision process vulnerability involved the performance of procedures in the field that had been previously identified as deficient. In this case, the inspectors identified that licensee personnel had not established any mechanism to inform maintenance supervisors and workers of these identified procedure issues so that they could be discussed during pre-job briefings. A second maintenance procedure process vulnerability concerned the exceptions to procedure guidance and a management expectation that procedures steps be accomplished in the order prescribed by the procedure. In one case, the inspectors identified a statement in several procedures that provided the provision for maintenance personnel, at the discretion of the first line supervisor, to perform procedure steps out-of-sequence. In a second case, the inspectors identified that a station administrative procedure, that allowed maintenance personnel to perform steps in any order unless otherwise specified in the work order package, was in conflict with a corporate procedure.

During observed training sessions, pre-job briefings, and in-field maintenance activities, the inspectors continued to identify human performance weaknesses. Although these human performance weaknesses were identified, they were not considered to be significant and licensee efforts in this area appear to have resulted in improved performance as reflected in human performance error trending data.

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4.0 ESW Pump Coupling Assembly Concerns

4.1 QC Inspection Point Assignment Review

a. Inspection Scope

During this inspection, the inspectors determined whether the licensee's actions to address the ESW Pump Coupling Assembly Concerns area were effective. In particular, the inspectors reviewed a sample of completed and planned work orders to determine whether QC inspection points had been appropriately assigned.

b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified and the inspectors determined that the licensee's corrective actions were effective.

The licensee utilized Nuclear Operating Procedure (NOP)-LP-2018, "Quality Control Inspection of Maintenance and Modification Activities," Revision 1 (which superceded NQI-1001), for the identification of QC inspection hold points during the planning of work orders. This procedure directed QC inspectors to consider failure history, risk significance, and failure probability in the QC hold point identification process. The inspectors reviewed 10 completed and planned work orders to determine whether QC inspection hold points had been appropriately identified. In all cases, the inspectors determined that the QC inspection hold points were identified and witnessed in accordance with the requirements of NOP-LP-2018.

Although all required QC hold points had been identified, the inspectors noted that Section 4.6, "Performing and Documenting Process Monitoring Inspections," of NOP-LP-2018, included guidelines for the performance of random QC monitoring inspections. The procedure stated that these inspections were not pre-assigned in a work order package, but were typically assigned as a result of a review of the current work schedule which specifically identified risk significant and maintenance rule related equipment as well as other critical components. The inspectors identified that licensee personnel had not performed any random QC monitoring inspections since the implementation of NOP-LP-2018 in December 2005. Licensee personnel generated CR 06-03353 to enter this issue into the corrective action program.

4.2 QC Inspection Point Assignment Program Review

a. Inspection Scope

During this inspection, the inspectors determined whether the licensee's actions to address the ESW Pump Coupling Assembly Concerns area were effective. To perform this assessment, the inspectors independently assessed the QC Inspection Point Assignment Program; and compared that assessment to a licensee self-assessment of the program. In particular, the inspectors reviewed DAMP Item B.2.2.3.2.1: "Perform an effectiveness review of the QC Inspection Point Assignment Program (05-03655-04)."

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b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified and the inspectors determined that the licensee's corrective actions were effective. In particular, the inspectors determined that the licensee had established an effective QC Inspection Point Assignment Program and had performed an adequate effectiveness review of the QC Inspection Point Assignment Program.

The inspectors concluded that the QC Inspection Point Assignment Program was currently effective and likely to be effective in the future based upon the program that has been established.

4.3 ESW Pump Coupling Assembly Concerns - Overall Assessment

a. Inspection Scope

Based upon the results of a review of revised maintenance procedures to determine whether QC inspection points had been appropriately assigned, as well as a review of the QC Inspection Point Assignment Program, the inspectors completed an overall assessment of the licensee's actions to address the area of ESW Pump Coupling Assembly Concerns.

b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified and the inspectors concluded that the licensee's corrective actions had been effective in addressing the ESW Pump Coupling Assembly Concerns area.

In particular, the inspectors concluded that the licensee had established an adequate QC Inspection Point Assignment Program; had properly assigned QC inspection hold points to all work order packages that were reviewed; and had conducted an adequate self-assessment of the QC Inspection Point Assignment Program.

5.0 Training Deviations in Stressful Situations

5.1 Training Deviations in Stressful Situations - Observations

a. Inspection Scope

During this inspection, the inspectors determined whether the licensee's actions to address the Training Deviations in Stressful Situations area were effective. To perform this assessment, the inspectors attended pre-job briefings prior to maintenance activities to identify any instances in which licensee personnel did not display a questioning attitude toward directions given that were contrary to written instructions or previous training (i.e. pushback). In addition, to assess the effectiveness of training, the inspectors reviewed training material that had been developed to train the staff on the new tools and expectations; and observed training sessions developed to assess the implementation of human performance tools by workers. Interviews were also

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conducted with maintenance workers and supervisors to determine whether the new expectations had been effectively communicated by management supervision and internalized by the staff.

b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified and the inspectors determined that the licensee's corrective actions were effective.

The inspectors concluded that the licensee's new human performance tools had been effective in addressing problems in this area. In particular, the inspectors noted that dynamic procedure adherence training along with enhanced pre-job briefing training have been beneficial in ensuring pushback was appropriately used by workers during maintenance activities. The pre-job briefing enhancements also resulted in the creation of pre-job briefing cards that contained pre-job briefing guidance in a bulletized easy-to-use format. The use of the revised pre-job briefing card resulted in consistently thorough discussions of planned activities and expected actions among maintenance personnel. The inspectors also noted that the pre-job briefing card was routinely used during all pre-job briefings and with a few minor exceptions, maintenance personnel raised issues and discussed the proper resolution of the issues.

5.2 Training Deviations in Stressful Situations - Records Review

a. Inspection Scope

During this inspection, the inspectors determined whether the licensee's actions to address the Training Deviations in Stressful Situations area were effective. To perform this assessment, the inspectors reviewed condition reports and other documentation associated with plant events and other stressful activities to identify any instances in which licensee personnel were not willing to "push back" when warranted.

b. Observations and Findings

Based on the results of this inspection, no findings of significance were identified and the inspectors determined that the licensee's corrective actions were effective.

The inspectors determined that condition reports and observations by maintenance supervisors and managers associated with pushback were entered into a database that allowed the generation of trend reports. These reports aided in the identification of declining trends in pushback and other areas of human performance.

The inspectors determined that the licensee had previously utilized a program that specifically observed and documented performance in the area of pushback, and that this program had provided management with a tool to assess pushback performance trends on a regular basis. However, in March 2006, Perry became the pilot plant to evaluate a new fleet-wide program. This new program resulted in the loss of the direct ability to record, evaluate, and track those aspects of human performance deficiencies that were directly related to pushback. The inspectors raised concerns regarding the

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loss of this capability during the inspection and licensee personnel generated CR 06-03346 to enter this issue into the corrective action program.

Subsequently, the licensee re-assessed the pilot program and revised the program to enhance the quality of the input as well as the ability to retrieve the raw data from the observations. These actions will provide a mechanism for the timely identification of declining trends in pushback or other human performance areas. In particular, licensee personnel revised Nuclear Operating Business Practice (NOBP)-LP-2018, "Integrated Performance Assessment/Trending," to specifically review this raw data for aspects of pushback and trained specific licensee personnel responsible for assessing the raw data and developing the trend reports. The inspectors concluded that these actions ensured the licensee's ability to sustain improving performance in this area.

5.3 Training Deviations in Stressful Situations - Overall Assessment

a. Inspection Scope

Based upon the observations of pre-job briefings prior to maintenance activities and a review of documentation associated with plant events and other stressful activities to identify any instances in which licensee personnel were not willing to "push back" when warranted, the inspectors completed an overall assessment of the licensee's actions to address the area of Training Deviations in Stressful Situations.

b. Observations and Finding

Based on the results of this inspection, no findings of significance were identified and the inspectors concluded that the licensee's corrective actions had been effective in addressing the Training Deviations in Stressful Situations area.

The inspectors concluded that the licensee had implemented human performance tools that have been effective in resolving concerns related to pushback. The enhancement to several of the licensee's existing human performance tools, such as the training and observation programs, indicated that maintenance personnel understood the pushback tools and have demonstrated the willingness to pushback when necessary. The structure of pre-job briefings demonstrated that enhancements to the existing tools were effective in allowing the workers to raise concerns and properly address those concerns.

In addition, the licensee's ability to monitor and trend declining performance in the area of pushback and other areas of human performance should continue to ensure the licensee's effectiveness in this area. The licensee revised the pilot observation program, following discussions with the inspectors, to ensure that attributes of pushback were specifically reviewed by licensee personnel to properly identify any declining trend in the area of pushback. Also, appropriate licensee personnel were trained to ensure trend reports properly captured deficient pushback attributes. The refinement of these existing management monitoring tools will allow the licensee to identify adverse trends, in a timely manner, and initiate corrective actions to address those trends.

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6.0 Exit Meeting

On August 15, 2006, the inspectors presented the inspection results to Mr. L. Pearce, Vice President, and other members of his staff, who acknowledged the findings and observations.

The inspectors 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

G. Leidich, Chief Nuclear Officer, FENOC
D. Pace, Senior Vice President, Fleet Engineering and Services, FENOC
J. Hagan, Chief Operating Officer, FENOC
J. Rinckel, Vice President, Oversight, FENOC
L. Pearce, Vice President, Perry
F. von Ahn, Plant Manager, Perry
F. Cayia, Director, Performance Improvement, Perry
J. Lausberg, Manager, Regulatory Compliance, Perry
G. Halnon, Director, Performance Improvement Initiative, Perry
J. Messina, Manager, Operations, Perry
J. Shaw, Director, Engineering, Perry
M. Wayland, Director, Maintenance, Perry

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

None.

Discussed

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.

Maintenance Procedure Adequacy

Condition Reports

06-03180; NRC 95002 - Untrained Individual Climbed Scaffold
06-03192; NRC 95002 - Placekeeping Concerns During Work Activity
06-03193; NRC 95002 - Scaffold Concerns Identified Following Work Activity
06-03194; NRC 95002 - Concerns Identified with GEI-0009
06-03199; NRC 95002 - Identified Concern in Procedure Use and Adherence Training
06-03215; 95002 Inspection - NRC Identified - Incorrect Procedure Reference
06-03213; 95002 Inspection Procedure: Solenoid Valves May not Be Installed Correctly
06-03217; Inadequate Information on Scaffold Tag
06-03233; FENOC Industrial Safety Manual Conflicts with FENOC Scaffold Procedures
06-03235; GEI-0136 Needs Enhanced
06-03247; NRC 95002 - Inconsistent Use of Placekeeping
06-03248; NRC 95002 - Incorrect Information Recorded on Data Sheets
06-03249; NRC 95002 - Potential Clearance Violation for Breaker Work
06-03250; NRC 95002 - Rollup Condition Report for Use of Placekeeping Techniques
06-03256; NRC 95002: Work Packages Lacking in Clear Direction
04-03039; PES to Ensure Current EPRI TR 1058745 is Reflected in GMI 182, 125
05-01029; PII Initiative Review of CR 03-04912: Concern with CA-17 Response
05-04586; PII F Team Review: Weak CA [Corrective Action] Responses for CR 03-05995 in the Area of Procedures
CR 04-05054; Review of Information Notice 2003-06; Failure of Safety-Related Linestarter Relays at SONGS
CR 06-00048; NRC 95002 Inspection Identified Numerous Procedure Issues such as Formatting, Typos, Missing Technical Information, Confusing Steps and Incorrect References
06-00125; NRC ID: Procedure Not Followed Correctly
06-00283; NRC ID GEI-0009 Breaker Step was Incorrectly N/A'd and Not Performed
06-00978, ICI-C-N64-2 Step Could Not Be Performed as Written
06-00366, NRC Observations for Procedure Enhancement
CR 06-01316; Workers Were Unable to Obtain Acceptable Tension While Using GMI-0073, Section 5
06-01371, ICI-B01-0009 Procedure Does Not Work as Written
CR 06-01581; Problems Encountered With Procedure GMI-0073 While Conducting Work Order 200202142
06-01765; NRC NCV [Non-Cited Violation] 2006007-02, Failure to Perform Required Steps in ICI-B120001
06-01831, GEI-0124 Can't Be Performed as Written
06-02038; Error Discovered in Surveillance

06-02242, GEI-124 Revision Omission
06-02366, H1205 Breaker Fails to Stop in Test Position

Procedures

CMI-0007; Maintenance of Limitorque MOV [Motor-Operated Valve] Type SMB-000, Revision 8
GCI-0016; Scaffolding Erection, Modification or Dismantling Guidelines
GEI-0001; Performing Insulation Resistance Checks GEI-0124, Types SS-3, SS-4, and SS-5
Solid State Trip Devices Testing and Calibration Using Multi-Amp CB-8160 Test Set; Revision 9
and Revision 10
GEI-0007A; Instructions for Cable/Wire Terminations; Revision 00
GEI-0007B; Raychem Installation and Removal Instructions; Revision 00
GEI-0009; ABB Low Voltage Power Circuit Breaker Types K-600 and K-600S; Revision 18 and
Revision 21
GEI-0012; Cleaning of Electrical Equipment; Revision 8
GEI-0014; Limitorque Limit/Torque Switch Adjustment; Revision 6
GEI-0047, Maintenance and Calibration of General Electric HFA Relays; Revision 5
GEI-0135; ABB Power Circuit Breakers 5kV Types 5HK250 and 5HK350 Maintenance;
Revision 13 and Revision 16
GEI-0136, ABB Power Circuit Breakers 15KV Type 15HK1000 Maintenance; Revision 16
GMI-0001; Coupling Alignment, Revision 4
GMI-0021; General Torquing; Revision 8
GMI-0039, Disassembly/Reassembly of Division I and II Emergency Service Water Pumps;
Revision 21
GMI-0061; Valve Packing Instructions; Revision 6
GMI-0073; V-Belt and Sheave Maintenance; Revision 8
ICI-C-D17-18, Calibration of Victoreen Beta Channels; Revision 3
NOP-LP-2001, Corrective Action Program; Revision 13
NOP-LP-2601, Procedure Use and Adherence; Revision 0
NOBP-LP-2604; Job Briefs; Revision 0
NOBP-LP-2019, Corrective Action Program Supplemental Expectations and Guidance;
Revision 2
NOP-WM-1001; Order Planning Process; Revision 6
NOBP-WM-4300; Order Execute Process Instructions, Revision 1
NOP-SS-3001, Procedure Review and Approval; Revision 9
NOP-WM-1001, Order Planning Process; Revision 6
PAP-0500; Perry Technical Procedure Writers Guide; Revision 1
PAP-0550.3, Procedure Validation; Revision 1
PAP-0507; Perry Supplemental Procedure Requirements/Guidance; Revision 23
PMI-0004; General Maintenance Checks; Revision 4
PMI-0030; Maintenance of Limitorque Valve Operators; Revision 12
PMI-0040, Division III Air Start Motor Maintenance; Revision 2
PMI-0050; Preventative Maintenance Lubricating Guidelines; Revision 4
PMI-0055; Division III HPCS [High Pressure Core Spray] Diesel Generator Jacket Water
Maintenance; Revision 3
PMI-0070; Division 3 HPCS Diesel Generator Engine Inspection; Revision 3
PMI-0074; Division 3 Exhaust Manifold Inspection; Revision 3
PMI-0075; Division III HPCS Diesel Generator Air Starting Solenoids and Relay Valves
Replacement; Revision 4

PMI-0078; Division III HPCS Diesel Generator Fuel System Maintenance; Revision 5
PMI-0095; Division III Diesel Generator Electrical Maintenance; Revision 7
PMI-0098; Radwaste Crane Preventive Maintenance; Revision 3
PMI-0105; DeLaval Diesel Generator Pedestal Bearing Inspection; Revision 5
PMI-0109; V-Belt and Sheave Inspection; Revision 1
SOI-R22; Metal Clad Switchgear 5-15KV; Revision 17
SOI-R23; 480 Volt Load Centers; Revision 5

Work Orders

200087860, Building Heater Hot Water Pump A
200153472, HPCS SUPR PL [Suppression Pool] High Level Channel C Calibration for 1E22-NO55C
200109072, Generator HPCS Emergency - Diesel Driven
200167206, Division 3 Local Relay Panel
200155345, Generator HPCS Emergency - Diesel Driven
200167206, Division 3 Local Relay Panel
WO 200192570; Inspect/Lube Plant Vent Isokinetic Sample Vacuum Pump
WO 200193988; Lube and Inspect Vent Sample Pump
WO 200158585; Lube and Inspect the Belts of Offgas Vault Refrigeration AHU [air handling unit]
WO 200195894; Replace V-belt on Plant Vent Isokinetic Sample Pump
WO 200186642; Replace Motor Sheave on Ventilation Exhaust Fan A
WO 200132496; LPCS [Low Pressure Core Spray] Room Air Handling Unit Fan Work
WO 200123164; Refurbish Actuator for 1M51F0615B
WO 200077204; Perform Breaker and Relay Checks on DC [direct current] Lube Oil Pump Breaker D1B12
WO 200053854; HPCS Suppression Pool Suction Valves
WO 200077202; 10 Year Overhaul of Breaker H2110
WO 200123164; Refurbish Actuator for 1M51F0615B
WO 200155342; Check Division 3 DG [Diesel Generator] Exhaust Connectors and Screen/Turbo Clearances
WO 200118847; Perform Full PMI-0030 on RWCU [Reactor Water Cleanup] Valve 1G33F034
WO 200160748; Lubricate Belts on Radwaste Building Exhaust Fan "A"
WO#200155340; Perform Fuel Oil Maintenance on the Generator High Pressure Core Spray Emergency Diesel
WO#200206648; Replace Division III Jacket Water
WO#200134219; Transformer EHF-2-A Cleaning and Service

Other Documents

Buffalo Forge Axial Fans Vendor Manual
Carrier 39E and 39B Air Handling Units, Service Instruction Manual
Letter PY-CEI/NRR-2897L, dated August 8, 2006, Response to NRC Inspection Procedure 95003
NRC Information Notice 2003-06; Failure of Safety-Related Linestarter Relays at SONGS
OJT-5142-01; Valve, Globe Maintenance, Revision 2
Material Safety Data Sheet 9012811-1; Lectra Clean II
MML-2176-01; Torquing Lab Guide, Revision 0

MM-2176-01; Torquing Lesson Plan, Revision 0
MS-2020-01; Minor Electrical Maintenance, Revision 1
IC-3317-02; Terminations Lesson Plan, Revision 2
MM-2026-09; Valve Fundamentals Training, Valve Packing; Revision 2
MM-2161-05; Advanced Valve Packing and Live Loading, Revision 1
MPO-2817-02; General Maintenance Check and Cleanliness Requirements, Revision 6
Perry Maintenance Department Expanded Maintenance Procedure Upgrade Project Plan,
Revision 1
Reviewed Effectiveness Review for Condition Report 05-03655
Supplemental Inspection, Inspection Report 05000440/2005003
T.B. Woods Equipment Vendor Manual
Westinghouse Safety Related Centrifugal Fans Service Manual

ESW Pump Coupling Assembly Concerns

Condition Reports

06-03353; NRC 95002 - This Observation Represents a Missed Opportunity

Procedures

NOP-LP-2018, Quality Control Inspection of Maintenance and Modification Activities, Revision 1

Work Orders

200176442, Lube/Oil SMPL Servive Water Screen Wash
200209202, Rework Weld on Tee Located on Upstream Side of Valve 1B33F0091B
200173141, RCIC [Reactor Core Isolation Cooling] Water Leg Pump - Replace Pump Bearings
200173811, Gas Detector Beta - Replace Detector Due to Age
2000023394, HPCS Diesel HX [Heat Exchanger] ESW [Emergency Service Water] Inlet - Valve
Leaks Past Seat
200063085, Diesel Generator Lube Oil Pump - Perform MCC [Motor Control Center] EF1E1-DD
Bucket Checks and Replace M Type Relay-Shadow
200187363, HPCS Emergency Service Water Pump - Upper Motor Bearing has High Particle
Count
200109073, Generator HPCS Emergency Diesel - Perform Engine Torque Checks
200155345, Generator HPCS Emergency Diesel - Perform Engine Maintenance

Training Deviations in Stressful Situations

Condition Reports

06-00670; Fire in Control Complex Due to Ventilation Fan 2B Fan Motor Failure
06-03047; MEAD Boundary Line Exceeded During Power Ascension on July 9, 2006
06-03293; Lack of the Ability to Generate Trend Reports From the New Observation Database
06-00896; Procedure Use and Adherence Training Requested by Maintenance Through the
Maintenance Training Review Committee

04- 04059; Some Barriers are Lost During Stressful Times
04-03020; Evaluate if Training is Providing the Desired Results of Preventing Events From Occurring

Procedures

NOP-LP-2601; Procedure Use and Adherence, Revision 0
NOBP-LP-2603; Human Performance Tools and Verification Practices, Revision 0
NOBP-LP-2604; Job Briefs, Revision 0

Other Documents

Core Work Practices Card (training assessment tool)
FENOC Performance Observation Cards
Pilot Performance Observation Card
Training Module entitled "The New FENOC Observation Database" presented on 2/27/06
NRC Event Notification Report for 2/13/06 on Declaration of an Alert Due to a Fire on the "B" Miscellaneous Equipment Area Return Fan
Selection of completed Coached Field Observation forms
MISC-OBSERVEXERCIS_PY-LG01; Observation Skills Lab Training Guide, Revision 0
MISC-PROCEDURE_PY; Procedure Use training materials
Lesson Plan HU-TOOLSQSTATCOM_PY-01; Human Performance Tools
Lesson Plan HU-FUNDAMENTALS_PY-01; Introduction to Human Performance, Revision 0
Lesson Plan HU-FUNDAMENTALS_PY-02; Excellence in Human Performance, Revision 0
Lesson Plan HU-FUNDAMENTALS_PY-03; How Events Happens, Revision 0
Lesson Plan HU-FUNDAMENTALS_PY-04; Individual Behaviors, Revision 0
Lesson Plan HU-TOOLS_PY-01; The Event Free Tools, Revision 0
Lesson Plan HU-TOOLS_PY-02; Self-Checking, Peer Checking and Procedure Adherence, Revision 0
Lesson Plan HU-TOOLS_PY-03; Effective Communications, Revision 0
Lesson Plan HU-TOOLS_PY-04; Job Briefs, Revision 0
Lesson Plan HU-FUND_PY-01; INPO Human Performance Fundamentals, Revision 1
Letter PY-CEI/NRR-2920L; Corrections to the Response of NRC inspection procedure 95003 Supplemental Inspection Report 05000440/2005003
Letter PY-CEI/NRR-2959L; Response to NRC Inspection Report 05000440/2006007

LIST OF ACRONYMS USED

ADAMS	Agency Document and Management System
CA	Corrective Action
CAL	Confirmatory Action Letter
CFR	<i>Code of Federal Regulations</i>
CMI	Corrective Maintenance Instruction
CR	Condition Report
DAMP	Detailed Action and Monitoring Plan
DCR	Document Change Request
EER	Engineering Evaluation Request
ESW	Emergency Service Water
FENOC	FirstEnergy Nuclear Operating Company
GEI	General Electrical Procedure
GMI	General Mechanical Instruction
HPCS	High Pressure Core Spray
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
LPSCS	Low Pressure Core Spray
MOV	Motor-Operated Valve
N/A	Not Applicable
NCV	Non-Cited Violation
NOBP	Nuclear Operating Business Practice
NOP	Nuclear Operating Procedure
NQI	Nuclear Quality Assurance Instruction
NRC	Nuclear Regulatory Commission
PAP	Perry Administrative Procedure
PARS	Publicly Available Records
PII	Performance Improvement Initiative
PMI	Preventive Maintenance Instruction
PNPP	Perry Nuclear Power Plant
QC	Quality Control
RHR	Residual Heat Removal
ROP	Reactor Oversight Program
SOI	Standard Operating Instruction
TS	Technical Specification
WO	Work Order

PERRY PERFORMANCE BACKGROUND

As discussed in the Perry Annual Assessment Letter dated March 4, 2004, plant performance was categorized within the Degraded Cornerstone column of the NRC's Action Matrix based on two White findings in the Mitigating Systems cornerstone. An additional White finding in the Mitigating Systems cornerstone was subsequently identified and documented by letter dated March 12, 2004.

The first finding involved the failure of the high pressure core spray (HPCS) pump to start during routine surveillance testing on October 23, 2002. An apparent violation of Technical Specification (TS) 5.4 for an inadequate breaker maintenance procedure was identified in IR 05000440/2003008. This performance issue was characterized as White in the NRC's final significance determination letter dated March 4, 2003. A supplemental inspection was performed in accordance with IP 95001 for the White finding. Significant deficiencies in the licensee's extent of condition evaluation were identified. Inspection Procedure 95001 was subsequently re-performed and the results of that inspection were documented in IR 05000440/2003012, which determined that the extent of condition reviews were adequate.

The second finding involved air binding of the low pressure core spray (LPCS)/residual heat removal (RHR) 'A' waterleg pump on August 14, 2003. A special inspection was performed for this issue and the results were documented in IR 05000440/2003009. An apparent violation of Technical Specification (TS) 5.4 for an inadequate venting procedure was identified in IR 05000440/2003010. This performance issue was characterized as White in the NRC's final significance determination letter dated March 12, 2004.

The third finding involved the failure of the 'A' Emergency Service Water (ESW) pump that was caused by an inadequate maintenance procedure for assembling the pump coupling that contributed to the failure of the pump on September 1, 2003. An apparent violation of TS 5.4 was documented in IR 05000440/2003006. This performance issue was characterized as White in the NRC's final significance determination letter dated January 28, 2004.

As documented in IP 95002 Supplemental Inspection Report 05000440/2004008, dated August 5, 2004, which reviewed the licensee's actions to address these issues, the NRC concluded that the corrective actions to prevent recurrence of a significant condition adverse to quality (SCAQ) were inadequate. Specifically, the same ESW pump coupling that failed on September 1, 2003, failed again on May 21, 2004. This resulted in the ESW pump White finding remaining open.

As a result, Perry entered the Multiple/Repetitive Degraded Cornerstone column for Mitigating Systems in the Reactor Safety strategic performance area for having two White inputs for five consecutive quarters. Specifically, for the third quarter of 2004, the waterleg pump finding remained open a fourth quarter while the ESW pump finding was carried open into a fifth quarter as a result of the findings of the IP 95002 supplemental inspection.

PERRY IP 95003 INSPECTION RESULTS

As a result of poor performance, the Nuclear Regulatory Commission (NRC) designated the Perry Nuclear Power Plant (PNPP), owned and operated by FirstEnergy Nuclear Operating Company (FENOC), as a "Multiple/Repetitive Degraded Cornerstone Column" facility in the NRC's Action Matrix¹ in August 2004. Accordingly, a supplemental inspection was performed in accordance with the guidance in NRC Inspection Manual Chapter (IMC) 0305 and Inspection Procedure (IP) 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input."

In addition, the scope of the IP 95003 inspection included the review of licensee actions to address deficiencies identified during a previous IP 95002 inspection. In particular, the NRC reviewed the licensee's root cause and corrective actions to address the areas of procedure adequacy, procedure adherence, and training deficiencies identified in the previous IP 95002 inspection; as well as the problem identification, root cause review, and corrective actions to address repetitive emergency service water (ESW) pump coupling failures.

By letter dated September 30, 2004, FENOC advised the NRC that actions were underway to improve plant performance. To facilitate these performance improvements, FENOC developed the Perry Performance Improvement Initiative (PII). As part of the NRC's IP 95003 inspection, the team conducted a detailed review of the PII.

As documented in IP 95003 Supplemental Inspection Report 50-440/2005003, the NRC determined Perry was being operated safely. The NRC also determined that the programs and processes to identify, evaluate, and correct problems, as well as other programs and processes in the Reactor Safety strategic performance area were adequate. Notwithstanding these overall conclusions, the NRC determined that the performance deficiencies that occurred prior to and during the inspection were often the result of inadequate implementation of the corrective action program and human performance errors.

The team identified that a number of factors contributed to corrective action program implementation problems. A lack of rigor in the evaluation of problems was a major contributor to the ineffective corrective actions. For example, in the engineering area, when problems were identified, a lack of technical rigor in the evaluation of those problems, at times, resulted in an incorrect conclusion, which in turn affected the ability to establish appropriate corrective actions. The team also determined that corrective actions were often narrowly focused. In many cases a single barrier was established to prevent a problem from recurring. However, other barriers were also available that, if identified and implemented, would have provided a defense-in-depth against the recurrence of problems. The team also identified that problems were not always appropriately prioritized, which led to the untimely implementation of corrective actions.

A number of programmatic issues were identified that have resulted in the observed corrective action program weaknesses. For example, the team identified a relatively high threshold for classifying deficiencies for root cause analysis. As a result, few issues were reviewed in detail. In addition, for the problems that were identified that required a root cause evaluation, the team

¹The NRC's Action Matrix is described in Inspection Manual Chapter 0305, "Operating Reactor Assessment Program."

found that the qualification requirements for root cause evaluators were limited and multi-disciplinary assessment teams were not required. The team also identified that a lack of independence of evaluators existed. This resulted in the same individuals repeatedly reviewing the same issues without independent and separate review. In addition, the team identified weaknesses in the trending of problems, which has hindered the ability to correct problems at an early stage before they become more significant issues. Finally, the team determined that a lack of adequate effectiveness reviews was a barrier to the identification of problems with corrective actions that had been implemented.

In the area of human performance, the team determined that a number of self-revealed findings relating to procedure adherence occurred that had a strong human performance contribution. These findings were derived from events that resulted in an unplanned engineered safety feature actuation, a loss of shutdown cooling, an unplanned partial drain down of the suppression pool, an inadvertent operation of a control rod (a reactivity event), and other configuration control errors. The team reviewed the events that occurred during the inspection and identified that the procedure adherence problems had a number of common characteristics. In a number of cases, personnel failed to properly focus on the task at hand. Although pre-job briefings were held prior to many events, and procedures were adequate to accomplish the intended activity, personnel failed to sufficiently focus on the individual procedure step(s) being accomplished and performed an action outside of that prescribed by the procedure. In some cases, the team determined that a lack of a questioning attitude contributed to the procedure problems that occurred. Although information was available to personnel that, if fully considered, could have prevented the procedure adherence issues that occurred, that information was not sought out or was not questioned. The presence of supervisors with the necessary standards to foster good procedure adherence could have acted as a significant barrier to prevent some of the problems that occurred. However, adequate supervisory oversight was not always available or used. Further, the team identified that available tools for assessing human and organizational performance had not been effectively used.

In the area of design, the IP 95003 inspection team concluded that the systems, as designed, built, and modified, were operable and that the design and licensing basis of the systems were sufficiently understood. Notwithstanding the overall acceptability of performance in the engineering area, the team identified common characteristics in a number of problems identified during the inspection. These characteristics included a lack of technical rigor in engineering products that resulted in an incorrect conclusion. Also, there appeared to be a lack of questioning by the licensee staff of some off-normal conditions. Finally, weaknesses in the communications between engineering and other organizations such as operations and maintenance sometimes hindered the resolution of problems.

In the area of procedure adequacy, the team determined that the licensee's procedures to safely control the design, maintenance, and operation of the plant were adequate, but warranted continued management focus and resource support. In particular, process-related vulnerabilities in areas such as periodic plant procedure reviews, procedure revisions, and use classifications were identified by the team.

In the area of equipment performance, the team acknowledged that the licensee had completed numerous recent plant modifications to improve equipment performance. In addition, improved engineering support and management oversight of equipment performance were noted.

Notwithstanding the above, the team identified numerous examples that indicated that the resolution of degraded equipment problems and implementation of the corrective action program continued to be a challenge to the organization.

In the area of configuration control, the team identified numerous examples that indicated the resolution of configuration control issues and implementation of the corrective action program continued to be a challenge to the organization. The team agreed with the licensee's assessment that continuing configuration control problems were primarily the result of inappropriate implementation of procedural requirements rather than the result of configuration management procedural shortcomings. However, given the errors associated with equipment alignment, as well as multiple errors associated with maintenance configuration control such as scaffolding erection, the team concluded that adequate evaluations of the root causes of configuration control errors had not been performed. The team also concluded that the licensee lacked rigor in its efforts to resolve latent configuration control issues. Several licensee-identified issues have not been corrected, and contributed to configuration control shortcomings.

In addition, in the area of emergency preparedness, the team determined that there were some performance deficiencies associated with the licensee's implementation of the Emergency Plan. A number of findings were identified in which changes to the Emergency Plan or Emergency Action Levels were made without required prior NRC approval. In addition, the results of the augmentation drill where personnel were called to report to the facility for a simulated emergency were unsatisfactory.

With regard to the NRC's review of issues associated with the previous IP 95002 inspection, the NRC determined that actions to address procedure adequacy and ESW pump failures was still in progress at the end of the IP 95003 inspection. In particular, the team identified that one of the licensee's corrective actions to address the verification of the quality of ESW pump work was inadequate. In addition, in light of the continuing problems in human performance and the impact on procedure adherence, the team concluded that actions to address procedure adherence had not been fully effective. Finally, actions to address training were also still in progress at the end of the inspection. In this case, the licensee's corrective actions to address this issue had not been timely and at the conclusion of the IP 95003 inspection, had not yet been implemented. As a result, the NRC concluded that the open White findings associated with the IP 95002 inspection would continue to remain open pending additional licensee actions and the NRC's review of those actions.

In the assessment of the licensee's performance improvements planned and implemented through the Perry PII, the team determined that the Perry PII had a broad scope and addressed many important performance areas. The IP 95003 inspection team also observed that, although substantially completed, the PII had not resulted in significant improvement in plant performance in several areas. There were a number of reasons identified as why this occurred, one being that the PII was largely a discovery activity, and as such, many elements of the PII did not directly support improving plant performance. Instead, the problems identified through the PII reviews were entered into the corrective action program and the proper resolution of these problems depended upon the proper implementation of the corrective action program. During the IP 95003 inspection, the NRC identified that in some cases the corrective action program had not been implemented adequately to address the concerns identified during PII reviews. The team identified that although many PII actions had been completed, some of the

more significant assessments, such as in the area of human performance, were still in progress at the end of the inspection. Overall, based on the factors discussed above, the NRC was unable to draw any definitive conclusions regarding the overall effectiveness of the Perry PII. As a result, further reviews were deemed to be necessary to determine whether the PII was sufficient to address and resolve the specific issues identified.