



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

July 31, 2012

EA 11-227

Mr. Anthony J. Vitale  
Vice President, Operations  
Entergy Nuclear Operations, Inc.  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043-9530

**SUBJECT: PALISADES NUCLEAR PLANT – NRC SUPPLEMENTAL INSPECTION  
REPORT 05000255/2012010, AND ASSESSMENT FOLLOW-UP LETTER**

Dear Mr. Vitale:

On June 29, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection pursuant to Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," at your Palisades Nuclear Plant. The enclosed inspection report documents the inspection results, which were discussed on June 29, 2012, with you and other members of your staff.

In accordance with the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed to follow-up on a White finding in the Mitigating Systems Cornerstone with low to moderate safety significance which occurred in the fourth quarter of 2011. This issue involved the inadvertent actuation of the overspeed trip mechanism on the turbine-driven auxiliary feedwater pump turbine during surveillance testing and was previously documented and assessed in NRC Inspection Reports 05000255/2011013 and 05000255/2011017. The NRC was informed on May 2, 2012, of your staff's readiness for this inspection.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and the contributing causes for the risk-significant issues were understood; (2) the extent of condition and extent of cause of the issues were identified; and (3) corrective actions were or will be sufficient to address and preclude repetition of the root and contributing causes.

The NRC determined that the staff at Palisades Nuclear Plant performed an acceptable evaluation of the White finding. The evaluation identified the primary root cause of the issue to be inadequate preparation and instruction related to maintenance on the turbine-driven auxiliary feedwater pump overspeed trip mechanism linkages during the turbine overhaul performed during refueling outage 1R21. Specifically, the licensee failed to perform several vendor-recommended maintenance activities such that the reliability of the turbine-driven auxiliary feedwater pump turbine overspeed trip device was not maintained. To correct this issue and prevent recurrence, the licensee revised the maintenance and post-maintenance testing procedures to include these maintenance activities and verify the reliability of the overspeed trip mechanism.

No findings were identified during this inspection.

The NRC has determined that inspection objectives stated above have been met. Therefore in accordance with IMC 0305, "Operating Reactor Assessment Program," this performance issue shall not be considered in the Action Matrix after the end of the third quarter of 2012. However, due to the performance issues in the Initiating Events cornerstone resulting in White (service water coupling failure) and Yellow (loss of a direct current bus) findings in the fourth quarter of 2011, the closure of this finding will not change Palisades Nuclear Plant's status in the Degraded Cornerstone Column of the ROP Action Matrix. The licensee remains in Column III (Degraded Cornerstone) of the Action Matrix until resolution of the issues associated with that cornerstone. A supplemental inspection for these issues is scheduled in September 2012.

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

Sincerely,

/RA/

John B. Giessner, Chief  
Branch 4  
Division of Reactor Projects

Docket Nos. 50-255  
License No. DPR-20

Enclosure: Inspection Report 05000255/2012010  
w/ Attachment: Supplemental Information

cc w/encl: Distribution via ListServ™

**U.S. NUCLEAR REGULATORY COMMISSION (NRC)**

**REGION III**

Docket No.: 50-255  
License No.: DPR-20

Report No.: 05000255/2012010

Licensee: Entergy Nuclear Operations, Inc.

Facility: Palisades Nuclear Plant

Location: Covert, MI

Dates: June 25, 2012, through June 29, 2012

Inspectors: J. Draper, Reactor Engineer, Lead Inspector  
S. Shah, Reactor Engineer

Approved by: J. Giessner, Chief  
Branch 4  
Division of Reactor Projects

Enclosure

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## **SUMMARY OF FINDINGS**

Inspection Report (IR) 05000255/2012010; 6/25/2012 – 06/29/2012; Palisades Nuclear Plant, Unit 1; Supplemental Inspection - Inspection Procedure (IP) 95001

Two regional inspectors performed this inspection.

### Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with IP 95001 “Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area,” to assess the licensee’s evaluation associated with the failure and inoperability of the turbine driven auxiliary feedwater (TDAFW) pump in May 2011 due to the invalid actuation of the turbine mechanical overspeed trip during testing. The NRC staff previously characterized this issue as having low to moderate safety significance, or white, as documented in NRC IR 05000255/2011017. During this supplemental inspection, the inspectors determined that the licensee performed a comprehensive evaluation of the self-revealed TDAFW pump failure, which occurred during a routine Technical Specification (TS) surveillance requirement (SR) test. The licensee identified the root cause of the failure to be inadequate preparation for the TDAFW turbine overhaul such that the reliability of the overspeed trip function was not ensured. The licensee’s evaluation determined that this root cause was limited to this overhaul activity, and has taken corrective actions to revise the maintenance and testing procedures so as to prevent recurrence of the issue.

Given the licensee’s acceptable performance in addressing the inoperable TDAFW pump, the white finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in Inspection Manual Chapter 0305, “Operating Reactor Assessment Program.” Inspectors will review the licensee’s implementation of corrective actions during a future inspection.

### Findings

No findings of significance were identified.

## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA4 Supplemental Inspection (95001)

##### .01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with Inspection Procedure (IP) 95001 to assess the licensee's evaluation of a white finding, which affected the Mitigating Systems Cornerstone in the reactor safety strategic performance area. The inspection objectives were to:

- provide assurance that the root and contributing causes of risk-significant issues were understood;
- provide assurance that the extent of condition and extent of cause of risk-significant issues were identified; and
- provide assurance that the licensee's corrective actions for risk-significant issues were or will be sufficient to address the root and contributing causes and to preclude repetition.

The licensee entered the Degraded Cornerstone Column of the NRC's Action Matrix in the fourth quarter of 2011 as a result of a yellow finding in the Initiating Events Cornerstone originating in 4Q2011. Palisades also has a white finding in the Initiating Events Cornerstone and a white finding in the Mitigating Systems Cornerstone, both originating 4Q2011. The White finding in the Mitigating Systems Cornerstone was associated with the inoperability of the turbine driven auxiliary feedwater (TDAFW) pump and is the subject of this inspection. On May 10, 2011, during routine Technical Specification (TS) surveillance requirement (SR) testing, the TDAFW pump, P-8B, tripped due to the unexpected actuation of the mechanical overspeed trip linkage. The finding was characterized as having white safety significance based on the results of a Phase 3 risk analysis performed by a region-based senior reactor analyst (SRA), as discussed in NRC IR 05000255/2011013 and finalized in NRC IR 05000255/2011017. The failure of TDAFW pump P-8B during the TS SR test was attributed to an inadequate maintenance procedure that resulted in improper maintenance, including greasing, of the turbine overspeed trip mechanism during the October 2010 refueling outage. Following the trip, the licensee took immediate corrective actions to remove grease from the overspeed trip mechanism knife-edge which contributed to the trip. This action and the subsequent post-maintenance testing (PMT) restored the TDAFW pump to operable status on May 12, 2011.

The licensee staff informed the NRC staff on May 2, 2012, that they were ready for the supplemental inspection. In preparation for the inspection, the licensee performed a root cause evaluation (RCE), CR-PLP-2011-5723, Revision 1, to determine the root and contributing causes of the TDAFW pump failure and to identify any organizational or programmatic issues or weaknesses in safety culture that contributed to the white finding. The licensee then performed a self-assessment of the root cause evaluation to assess the RCE quality.

The inspectors reviewed the licensee's RCE and self-assessment in addition to other corrective action program documents, procedures, work orders, and vendor information.

In addition, the team viewed the turbine-driven auxiliary feedwater pump as well as interviewed approximately 20 plant employees from various areas and levels of the licensee's organization. These inspection activities were performed to aid the inspectors in determining whether root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition.

## .02 Evaluation of the Inspection Requirements

### 02.01 Problem Identification

- a. IP 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and the conditions under which the issue was identified.

The inspectors determined that the RCE adequately discussed the identification of the issue. During the testing of P-8B on May 10, 2011, the auxiliary feedwater pump tripped on overspeed, at which time the test was stopped and the pump was declared inoperable. The inspectors verified that this information was documented in the licensee's RCE. In the problem statement of the root cause report, the licensee identified that the failure of the auxiliary feedwater pump was self-revealing when it tripped unexpectedly during the performance of TS Surveillance Procedure, RO-97, "Auxiliary Feedwater System Automatic Initiation Test Procedure," resulting in additional unavailability time. Condition Report (CR) CR-PLP-2011-02350 was generated to document the failure. The root cause evaluation was completed under condition report CR-PLP-2011-05723 as a corrective action for the parent CR-PLP-2011-02350.

- b. IP 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents how long the issue existed and prior opportunities for identification.

The licensee's RCE documented that the auxiliary feedwater pump was likely inoperable since the 10-year maintenance was last performed during the refueling outage on October 29, 2010, which was when the knife-edge was greased. As part of the maintenance activity, the turbine over speed mechanism was tested using an electric motor per procedure WI-214382 "Auxiliary feedwater turbine K-8 over speed trip test using turbine trip overspeed device (TTOD)." The turbine did not experience an overspeed trip during this test. The pump also successfully completed surveillance procedure "QO-21B - P-8B, IST Auxiliary Feedwater System" on 15 February 2011 under Work Order 52293482. This test operated the pump on recirculation to Condensate Storage Tank. The licensee did not identify any issues related to the overspeed trip mechanism during these two surveillance tests. The licensee's past operability recommendation performed following the May 10, 2011 trip determined P-8B was inoperable between October 29, 2010 and May 10, 2011.

The licensee's RCE found that the 10-year overhaul performed during 1R21 refueling outage did not adequately refurbish, replace, and test governor and over speed trip components on P-8B. The licensee's evaluation concluded that they had the opportunity to obtain the updated vendor bulletin (that included recommendations for measurement of trip lever shoulder stud clearance, trip lever lateral movement checks, governor valve seat rib location verification and documentation of visual checks of trip pin condition and orientation) since August 2007, but did not.

The inspectors determined that the licensee's evaluation was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

- c. IP 95001 requires that the inspection staff determine that the licensee's evaluation documents the plant specific risk consequences, as applicable, and compliance concerns associated with the issue(s).

The NRC determined the May 2011 pump failure was a White finding, as documented in Inspection Report (IR) 05000255/2011017. The inspectors found that the licensee's root cause evaluation did not address the plant specific risk consequences resulting from failure of the auxiliary feedwater pump. Although the quantitative risk consequences were documented by the licensee in EA-PSA-SDP-P8B-11-05, "Risk assessment of Turbine Driven Auxiliary Feedwater Pump Trip," Revision 1, the inspectors observed that the RCE itself did not clearly state the actual (or potential) safety consequences arising from the failure condition. The licensee captured this observation in condition report, CR-PLP-2012-04767. The inspectors determined that this omission did not impact the effectiveness of the RCE as the detailed risk assessment was previously provided by the site and analyzed by NRC risk experts.

The RCE included a discussion of nuclear, radiological and environmental safety significance and stated that no actual consequences resulted from the inoperability of auxiliary feedwater system. The licensee's risk assessment concluded that the change in core damage frequency was less than  $1E-06/\text{yr}$ , or Green. The differences between the NRC's risk evaluation and the licensee's risk evaluation are discussed in IR 05000255/2011013. Interviews with licensee personnel indicated the licensee understood the differences between their evaluation and the NRC's Probabilistic Risk Assessment (PRA) evaluation.

The licensee evaluated the compliance concerns and determined the inoperability of the TDAFW was a violation of TS and Licensee Event Report (LER) 2011-004-01 has been submitted. The inspectors determined that the licensee's evaluation in this area was adequate.

d. Findings

No findings of significance were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. IP 95001 requires that the inspection staff determine that the licensee evaluated the issue using a systematic methodology to identify the root and contributing causes.

The licensee used the following systematic methods to complete the root cause evaluation:

- data gathering through interviews, document review, and discussions with the turbine vendor, Elliott;
- contracted MPR Associates, Inc., to perform an overspeed trip mechanism linkage force calculation;
- event timeline;
- failure mode analysis;



- failure fault tree;
- hazard, barrier and target analysis.

The inspectors determined that the licensee evaluated the issue using a systematic methodology to identify root and contributing causes.

- b. IP 95001 requires that the inspection staff determine that the licensee's RCE was conducted to a level of detail commensurate with the significance of the issue.

The licensee used a root cause evaluation team that consisted of members of mechanical maintenance, operations, and engineering, as well as a consultant. This team performed a detailed evaluation that identified several maintenance deficiencies on the overspeed trip mechanism linkage that, when combined, made the pump susceptible to invalid trips at speeds below the overspeed trip setpoint. These maintenance deficiencies included failing to: rotate the knife edge, replace the latch plate, replace the reset lever springs, verify there is no foreign material in the governor, adjust the trip mechanism backseat, and verify the overspeed gap is correct. These deficiencies that were the root cause of the failure were identified through the failure mode analysis performed by the RCE team.

The RCE team's failure mode analysis evaluated each potential failure mode (several of which were discussed in Elliott Technical Service Letter ETSL-T-2012, "Spurious Trips on YR Turbines," issued on August 1, 2007) to determine whether evidence supported or refuted it as a possible cause. The licensee determined that while each individual failure mode would not have caused, by itself, the failure of the pump on May 10, 2011, the combination of several of these failure modes put the turbine in a condition where it was susceptible to inadvertent actuation of the overspeed trip mechanism.

In addition to the root cause, the RCE team identified several more fundamental problems that contributed to the failure and the root cause. Some of these contributing causes were deficiencies associated with the control of critical maintenance, the control of supplemental workers, and the implementation of new vendor information. Based on the comprehensive evaluation performed for this root cause evaluation, the inspectors concluded that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

- c. IP 95001 requires that the inspection staff determine that the licensee's RCE included a consideration of prior occurrences of the issue and knowledge of operating experience (OE).

The licensee's RCE included an evaluation of internal and external OE. This OE evaluation included previous similar events involving overspeed protection issues associated with steam-driven equipment, both internally and from the industry. However, the RCE did not include an evaluation of previous events associated with the contributing causes, specifically, examples of issues with the control of critical maintenance and supplemental workers. This OE evaluation, though, was performed in the licensee's self-assessment of the RCE, so the inspectors found this evaluation to be acceptable.

One of the issues identified in the licensee's RCE is the failure to incorporate vendor recommendations into the maintenance procedure for the TDAFW turbine overhaul.

This was identified as one of the contributing causes to the TDAFW failure. In response to this deficiency, the licensee initiated a corrective action to ensure that these recommendations were evaluated and incorporated into the maintenance procedure. The licensee also has a corrective action to review preventative maintenance activities and equipment overhaul activities to ensure that appropriate vendor recommendations and information have been reviewed and incorporated into the work instructions and procedures.

Based on the licensee's evaluation and conclusions, both in the RCE and in the RCE self-assessment, the inspectors determined that the licensee's RCE included a consideration of prior occurrences of the problem and knowledge of prior OE.

- d. IP 95001 requires that the inspection staff determine that the licensee's RCE addresses the extent of condition and extent of cause of the issues.

The licensee's evaluation considered the extent of condition associated with the degraded turbine overspeed trip device as well as the work performed by the maintenance contractors who lubricated the incorrect linkages. With respect to the turbine trip, the licensee determined that no other auxiliary feedwater system equipment was adversely affected based on subsequent surveillance test performances. With respect to the degraded overspeed trip device, the licensee determined that no other steam-driven equipment in the plant was susceptible to this same type of failure. Finally, with respect to the work performed by the maintenance contractors, the licensee determined that the maintenance on the TDAFW pump was the only work performed by this maintenance crew during the refueling outage.

The licensee's evaluation also considered the extent of cause associated with the planning and preparation for maintenance on critical equipment by supplemental workers. The licensee reviewed other outage work, equipment overhaul work, and preventative maintenance activities to look for weaknesses in the control of critical tasks and contract workers. The licensee also looked for the incorporation of vendor information, which was a contributing cause. The licensee identified that the lack of a final procedure relative to supplemental workers was a weakness, and has finalized procedure EN-MA-101-01, "Critical Maintenance Identification and Oversight." No significant deficiencies were found. The inspectors concluded that the licensee's RCE addressed the extent of condition and the extent of cause of the issue.

- e. IP 95001 requires that the inspection staff determine that the licensee's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0310, "Components Within the Cross-Cutting Areas."

The licensee identified several weaknesses in the cross-cutting area (cross-cutting areas represent attributes of safety culture) of Human Performance, including in the cross-cutting components of Resources and Work Control. The licensee also identified a weakness in the cross-cutting area of Problem Identification and Resolution in the component of Operating Experience, and a weakness in the cross-cutting component of Accountability, which is not associated with a cross-cutting area. Specifically, the licensee identified that work authorizing documents did not include details appropriate for outage work on high critical equipment (Resources); the Maintenance organization did not recognize or prepare for outage work on high critical equipment as performed by

supplemental workers (Work Control); available vendor and industry operating experience was not fully reflected into work authorizing documents or referenced maintenance procedures (Operating Experience), and managers and supervisors did not reinforce adherence to procedures among those doing the work on the TDAFW pump turbine overhaul (Accountability). These weaknesses correlate to the cross-cutting aspects H.2(c), H.3(a), P.2(a), and O.1(b), respectively, as described in Inspection Manual Chapter (IMC) 0310 dated October 28, 2011.

The licensee addressed these weaknesses with a series of corrective actions including reviewing work activities to verify critical maintenance is identified and reviewing work orders and preventative maintenance activities to verify vendor information has been incorporated. The inspectors determined that the licensee's RCE included a proper consideration of whether weaknesses in any safety culture components were root causes or significant contributing causes of the issue.

f. Findings

No findings of significance were identified.

02.03 Corrective Actions

- a. IP 95001 requires that the inspection staff determine that (1) the licensee specified appropriate corrective actions for each root and/or contributing cause, or (2) an evaluation that states no actions are necessary is adequate.

The licensee implemented immediate corrective actions to restore the auxiliary feedwater pump's operability. They cleaned the grease from the knife edge, checked the trip linkage and cleaned the steam traps. In addition, to address the root causes, they revised FWS-M-6, "Auxiliary Feedwater Turbine Maintenance," to incorporate recommendations from the Elliott Technical Service Letter ETSL-2012, industry experience and the results from the root cause evaluation. This included identification of critical steps and checks of linkage and trip pin clearances with provisions for recording of as-found data for review by plant personnel. Changes implemented by the licensee also included requirements for periodic replacement of trip mechanism springs, latch parts, trip pin and plunger. Post-maintenance testing instructions in the maintenance procedure were changed from suggestions to requirements. The corrective actions for the root and contributing causes listed in RCE CR-PLP-2011-05723 appear to be appropriate.

To address the contributing causes such as poor vendor information control, the licensee established a program to ensure that the system engineer validates any vendor recommendations, vendor bulletins or operating experience prior to performance of preventative maintenance on equipment that requires overhaul or refurbishment. The licensee also implemented programs to ensure that the requirements of critical maintenance were met in accordance with procedure EN-MA-101-01, "Critical Maintenance Identification and Oversight," and work package evaluations adequately addressed supplemental worker performance during outages. Although substantial progress was achieved in the area of supplemental worker performance, the inspectors identified instances where additional licensee oversight was required.

During refueling outage 1R22, the licensee's quality assurance staff identified that prior to the pressurizer manway installation, the licensee failed to brief supplemental workers in accordance with plant procedure EN-HU-102, "Human Performance Tools." The briefing was performed using a vendor pre-job brief checklist and did not contain all the information required by procedure EN-HU-102. The brief was led by the vendor personnel with no Entergy supervision. The licensee captured this issue in CR-PLP-2012-03560 and CR-PLP-2012-03561. Also, on May 2, 2012, the licensee identified that steam generator primary manway ultrasonic testing readings were outside the acceptable range. The licensee completed an apparent cause evaluation (CR-PLP-2012-03497) and concluded that a supplemental worker had programmed the incorrect stud material configuration which resulted in the ultrasonic readings being outside the required range. The procedure used by the worker did not identify the stud material and the worker assumed that the material used at Palisades was similar to the ones used at other facilities. Tensioning activities for the steam generator were stopped by management and they determined a more appropriate course of action to ensure that the elongation measurements for the steam generator man ways were acceptable going forward. Also, during the same refueling outage, on April 29, 2012, during reactor head reassembly, damage was caused to the incore instrument flange #6 tree assembly and bull nose. The root cause evaluation (CR-PLP-2012-03411) performed by the licensee concluded that the supplemental workers did not positively verify proper alignment nor perform the procedure step for guiding the bullet nose into the nozzle and that procedure RFL-R-16, "Reactor Vessel Closure Head Installation," did not adequately provide proper instructions or acceptance criteria. Work was stopped and the reactor head was safely placed on the head stand. Although there were no consequences of safety significance in these three instances, the inspectors stressed the importance of ensuring proper oversight of supplemental workers to prevent recurrence of such events.

The inspectors determined they had reasonable assurance that the licensee's proposed corrective actions were appropriate and addressed each root and contributing cause so this area may be closed. The inspectors note this area should be a continuing focus at the site.

- b. IP 95001 requires that the inspection staff determine that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.

The licensee's immediate corrective actions restored the auxiliary feedwater pump to operable status. After restoring the pump, the licensee tested P-8B to ensure that the pump would perform its intended functions when required. The resident inspectors witnessed this testing and observed that the auxiliary feedwater pump successfully passed the surveillance test.

The licensee's corrective actions to address the root and contributing causes were prioritized in accordance with procedure, EN-LI-102, "Corrective Action Process," and Root Cause Evaluation Quality Checklist/Score Sheets. The corrective actions were scored based on licensing, regulatory performance and nuclear safety factors. The licensee's plan to verify vendor information was implemented based on the risk significance of the equipment. The licensee implemented programs to ensure that critical steps were identified in accordance with plant procedure EN-MA-101-01, "Critical Maintenance Identification and Oversight," prior to performance of critical maintenance activities. The inspectors reviewed the licensee's plans for accomplishing the above tasks and noted that the risk significance of the equipment was being appropriately

considered. Based on the guidance provided in the licensee's procedures and the prioritization of the corrective actions in accordance with these procedures, the inspectors determined that the corrective actions were prioritized with consideration of the risk significance and regulatory performance.

- c. IP 95001 requires that the inspection staff determine that the licensee established a schedule for implementing and completing the corrective actions.

The licensee established due dates for the corrective actions in accordance with procedure EN-LI-102, "Corrective Action Process," requirements for timeliness. Some of the due dates were captured in CR-PLP-2011-05723; however, many of the due dates for the action items were contained throughout the licensee's corrective actions program in various condition reports. The inspectors determined that the licensee adequately established a schedule for implementing and completing the corrective actions. The corrective actions for this RCE were completed in June 2012. All CAPRs have been completed and effectiveness reviews for those CAPRs will be completed by November 2013. The inspectors considered the timeline for completion of corrective actions to be appropriate.

- d. IP 95001 requires that the inspection staff determine that the licensee developed quantitative and/or qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition.

As documented in root cause evaluation, CR-PLP-2011-05723, the licensee established measures for determining the effectiveness of the corrective actions. These measures included:

- Enhanced monitoring of maintenance and corrective action records related to K-8 equipment to ensure that any additional failures are given appropriate management attention;
- Verify corrective actions resulting from evaluation of CR-PLP-2012-0362 will ensure future control of vendor documents, including changes, for plant equipment and have bounded the vendor document control deficiencies identified;
- No K-8 related plant unexpected Limited Condition of Operation (LCO) due to maintenance activities; and
- Revised auxiliary feedwater pump procedure updated to reflect results of the RCE for all aspects of turbine overhaul work.

The licensee staff entered these corrective action items into their corrective action program to ensure that these effectiveness reviews and enhanced monitoring were performed. The inspectors determined that quantitative and qualitative measures of success had been developed for determining the effectiveness of the corrective actions to preclude repetition.

- e. IP 95001 requires that the inspection staff determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.

The NRC issued an NOV to the licensee on January 3, 2012. The Notice of Violation associated with the White finding that was the subject of this IP 95001 inspection identified one violation of NRC requirements. In particular, a violation of TS 3.7.5 occurred from October 29, 2010, to May 10, 2011, due to the safety related steam driven auxiliary feedwater pump P-8B being inoperable as a result of maintenance not being prescribed by documented instructions or procedures. The NRC has concluded that information regarding the reasons for the violation, the corrective actions taken and planned to be taken to correct the violation and prevent recurrence, and the date when full compliance was achieved, is already adequately addressed on the docket in NRC IR No. 05000255/2011013 and in the licensee's response to the NRC dated November 28, 2011. During this inspection, the inspectors confirmed that the licensee's RCE and planned and taken corrective actions addressed the NOV. The licensee restored full compliance on May 11, 2011, by cleaning the grease from the knife edge, checking the trip linkage and performing a surveillance run of the pump.

- f. Findings

No findings of significance were identified.

#### 4OA6 Exit Meeting

On June 29, 2012, the inspectors presented the inspection results to Mr. Anthony Vitale, Vice-President of Operations, Palisades Nuclear Plant, and other members of his staff. The inspectors asked the licensee if any of the material examined during the inspection should be considered proprietary. The licensee did not identify any proprietary information.

#### Regulatory Performance Meeting

On June 29, 2012, the NRC met with the licensee to discuss its performance in accordance with IMC 0305, Section 10.02.b.4. During this meeting, the NRC and licensee discussed the issues related to this White finding that resulted in Palisades Nuclear Plant being placed in a Column of the NRC's ROP Action matrix with additional oversight. This discussion included the causes, corrective actions, extent of condition, extent of cause, and other planned licensee actions.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

A. Vitale, Vice President, Operations  
M. Sicard, Special Projects  
A. Bono, Engineering Inspection Support  
C. Arnone, NSA Director

#### Nuclear Regulatory Commission

J. Jandovitz, Acting Chief, Division of Reactor Projects, Branch 4  
J. Giessner, Chief, Division of Reactor Projects, Branch 4  
T. Taylor, Senior Resident Inspector, Palisades  
A. Scarbeary, Resident Inspector, Palisades  
J. Ellegood, Senior Resident Inspector, Donald C. Cook

### **LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

#### Opened

None.

#### Closed

05000255/2011013-01	VIO	Improper Lubrication of Turbine Driven Auxiliary Feedwater Pump Linkages
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## LIST OF DOCUMENTS REVIEWED

The following is a partial 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.

### 4OA4 Supplemental Inspection

0098-1103-0171-00; 95001 Supplemental Inspection Preparations; March 20, 2012  
0098-1201-01; MPR Associates Inc., Evaluation of Palisades AFW Pump Turbine Exhaust Condensate Collection; May 10, 2012  
0098-1201-01; MPR Associates Inc., Evaluation of Palisades AFW Pump Turbine Exhaust Condensate Collection; April 12, 2012  
1.15; Performance of Job Briefings; Revision 7  
4.02; Control of Equipment; Revision 62  
5.18; Control of Work Instructions; Revision 7  
5.19; Post Maintenance Testing; Revision 13  
5.36; Maintenance Inspection Program; Revision 0  
Calculation 98-01 71-01; Calculation of Overspeed Trip Mechanism Linkage Forces; Revision 0  
Corrective Action Initiation and Response Job Aid; February 3, 2011  
CR-ANO-1-1990-00097; Monthly Test of P-7A; March 17, 1990  
CR-ANO-1-1990-00319; Local Manual Trip did not cause a Turbine Trip; August 14, 1990  
CR-PLP-2009-04872; Breaker did not operate as expected; October 20, 2009  
CR-PLP-2010-00925; Troubleshooting of Breaker 52-9102; March 4, 2010  
CR-PLP-2010-02017; Auxiliary Feedwater Pump PM; May 17, 2010  
CR-PLP-2010-04584; Material Deficiencies Identified During Overhaul; October 7, 2010  
CR-PLP-2010-04604; Stripped Terminal Screw; October 7, 2010  
CR-PLP-2010-04631; Material Deficiencies Identified During Overhaul; October 8, 2010  
CR-PLP-2010-05113; Overspeed Trip Mechanism Failure; October 16, 2010  
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 Feedwater Pump Inoperable in Excess of Technical Specification  
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 M-205, Sheet 2; Piping and Instrument Diagram Main Steam and Auxiliary Turbine Systems; Revision 68  
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 Palisades Key Vendor List; June 28, 2012  
 Palisades Nuclear Power Plant 95002 / 95001 Project Action Plan; Revision 1  
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 Requirements Due to Unexpected Trip; January 21, 2012  
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 RO-127; Auxiliary Feedwater System, 18-Month Test Procedure; Revision; 11  
 RO-145; COMPREHENSIVE PUMP TEST PROCEDURE AUXILIARY FEEDWATER PUMPS P-8A, P-8B AND P-8C; Revision 10  
 RO-97; Auxiliary Feedwater System Automatic Initiation Test Procedure; Revision 15  
 SOP-12; Feedwater System; Revision 62  
 T-186; AUXILIARY FEEDWATER TURBINE K-8 OVERSPEED TRIP TEST AND GOVERNOR SETTING; Revision 15  
 T-187; AUXILIARY FEEDWATER TURBINE K-8 AND PUMP P-8B PERFORMANCE; Revision 7  
 Vendor Information Solutions Call Log Sheet to Elliott TurboMachinery; August 4, 2004  
 WO-PLP- 00298982; PCV-1479 Pressure Erratic; January 11, 2012  
 WO-PLP- 00312927; VHX-2; Raise Duct above SIS Piping by P-50B per EC-36793; June 11, 2012  
 WO-PLP- 52235978; \*EEQ\* Aux FW Flow Control to E-50B; May 31, 2011  
 WO-PLP- 52235982; Grease CV-0522B; May 26, 2011  
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 WO-PLP- 52289689; RO-97B – Aux Feedwater System Automatic Initiation Test; May 31, 2011  
 WO-PLP- 52293482; QO-21B - P-8B, IST Auxiliary Feedwater System; June 15, 2011  
 WO-PLP- 52322759; QO-21B - P-8B, IST Auxiliary Feedwater System; August 9, 2011  
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 WO-PLP- 52398329; Monthly Void Monitoring - GL 2008-01; June 11, 2012  
 WO-PLP- 52407291; K-6B D/G Oil Leakage Survey; May 25, 2012  
 WO-PLP-00214219; K-8, Turbine Overhaul PM; November 29, 2010  
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 WO-PLP-214219; K-8, Turbine Overhaul PM; November 29, 2010  
 WO-PLP-214382; T-186 K-8 Overspeed Trip Test; November 24, 2010  
 WO-PLP-251496; HIC-0749 Replace Controller; May 31, 2011  
 WO-PLP-255002; RO-145B -P-8B AFW Comprehensive Pump Test; November 29, 2010  
 WO-PLP-276614-10; K-8, Clean Lube off Knife Edge; May 11, 2012  
 WO-PLP-276741; ST-0514 Inspection and Maintenance PM; May 7, 2011  
 WO-PLP-276747; ST-0523 Inspection and Rebuild PM; May 31, 2011

WO-PLP-276751; QO-21B - P-8B IST Auxiliary Feedwater System; May 26, 2011  
WO-PLP-281389; CV-0598, K-8 Spring Rate of Reset Arm Needed > Trip Analysis; March 29,  
2012

No findings were identified during this inspection.

The NRC has determined that inspection objectives stated above have been met. Therefore in accordance with IMC 0305, "Operating Reactor Assessment Program," the performance issue shall not be considered in the Action Matrix after the end of the third quarter of 2012. However, due to additional performance issues in the Initiating Events cornerstone resulting in a white performance indicator and a yellow finding with moderate safety significance, the closure of this finding will not change Palisades Nuclear Plant's status in the Degraded Cornerstone Column of the ROP Action Matrix.

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Sincerely,

/RA/

John B. Giessner, Chief  
Branch 4  
Division of Reactor Projects

Docket Nos. 50-255  
License No. DPR-20

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Letter to A. Vitale from J. Giessner dated July 31, 2012.

SUBJECT: PALISADES NUCLEAR PLANT – NRC SUPPLEMENTAL INSPECTION  
REPORT 05000255/2012010, AND ASSESSMENT FOLLOW-UP LETTER

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