UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

April 3, 2014

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

SUBJECT: TURKEY POINT NUCLEAR GENERATING PLANT UNIT 3 – U.S. NUCLEAR REGULATORY COMMISSION SUPPLEMENTAL INSPECTION REPORT 05000250/2014008

Dear Mr. Nazar:

On April 21, 2013, your staff reported an Unplanned Scrams per 7000 Critical Hours performance indicator that crossed a threshold from green to white. Based on your report, the Nuclear Regulatory Commission (NRC) assigned a white performance indicator Action Matrix input to the initiating events cornerstone in the first quarter of 2013. In response to this Action Matrix input, the NRC informed you that a supplemental inspection under Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," would be required.

On January 8, 2014, you informed the NRC that Turkey Point Nuclear Generating Unit 3 was ready for the supplemental inspection. On March 7, 2014, the NRC completed the supplemental inspection and discussed the results of this inspection and the implementation of your corrective actions with Mr. Conboy and other members of your staff. The inspection team documented the results of this inspection in the enclosed inspection report.

The NRC performed this supplemental inspection to determine if: 1) the root and contributing causes for the significant issues were understood, 2) the extent of condition and extent of cause for the identified issues were understood, and 3) your completed or planned corrective actions were sufficient to address and prevent repetition of the root and contributing causes. The NRC determined that your staff's evaluation identified the primary root and contributing causes for each of the reactor trips that contributed to the white performance indicator. Additionally, the NRC determined that your staff's evaluation ensured the extent of conditions and extent of causes for the reactor trips were understood. The NRC concluded that corrective actions were adequate to prevent repetition of the root and contributing causes. In accordance with IMC 0305, "Operating Reactor Assessment Program," the Unplanned Scrams per 7,000 Critical Hours performance indicator will continue to be considered as a white Action Matrix input until the performance indicator has returned to the green performance band.

NRC inspectors documented one finding of very low safety significance (Green) in this report. The finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II; and the NRC resident inspector at Turkey Point Nuclear Generating Units 3 and 4.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, “Public Inspections, Exemptions, Requests for Withholding,” 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’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents 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/

Daniel W. Rich, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket No.: 50-250
License No.: DPR-31

Enclosure: Inspection Report 05000250/2014008
w/ Attachment: Supplemental Information

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Letter to Mano Nazar from Daniel W. Rich dated April 3, 2014.

SUBJECT: TURKEY POINT NUCLEAR GENERATING PLANT UNIT 3 – U.S. NUCLEAR REGULATORY COMMISSION SUPPLEMENTAL INSPECTION REPORT 05000250/2014008

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-250
License No.:	DPR-31
Report No:	05000250/2014008
Licensee:	Florida Power & Light Company (FP&L)
Facility:	Turkey Point Nuclear Generating Unit 3
Location:	9760 S. W. 344th Street Homestead, FL 33035
Dates:	March 3-7, 2014
Inspectors:	W. Deschaine, Resident Inspector, Sequoyah Nuclear Plant (lead) T. Hoeg, Senior Resident Inspector, Turkey Point Nuclear Plant M. Endress, Resident Inspector, Turkey Point Nuclear Plant
Approved by:	Daniel W. Rich, Chief Reactor Projects Branch 3 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05000250/2014008; 03/03/2014 – 03/07/2014; Turkey Point Nuclear Generating, Unit 3; Supplemental Inspection for a White Performance Indicator (PI); Follow-up of Events and Notices of Enforcement Discretion

A senior resident inspector and two resident inspectors performed this inspection. The inspectors identified one finding having very low (green) safety significance that was not associated with a regulatory violation. The significance of inspection findings are identified by their color (Green, White, Yellow, or Red) and are determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP) dated June 2, 2011. The cross-cutting aspect was determined using IMC 310, "Aspects Within the Cross-Cutting Areas," dated December 19, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4.

Cornerstone: Initiating Events

The NRC staff performed this supplemental inspection in accordance with inspection procedure (IP) 95001, "Supplemental Inspection for One or Two Inputs in a Strategic Performance Area," to assess the licensee's evaluation associated with a Unit 3 white performance indicator in the initiating events cornerstone. The Unit 3 unplanned scrams (reactor trips) per 7,000 critical hours performance indicator crossed the threshold from green (very-low risk significance) to white (low-to-moderate risk significance) performance in the first quarter of 2013 following three unplanned reactor trips that occurred on February 11, 2013, February 18, 2013, and March 12, 2013. In addition, there was a fourth unplanned Unit 3 reactor trip that contributed to the performance indicator on May 10, 2013.

The NRC performed this supplemental inspection to determine if: 1) the root and contributing causes for the significant issues were understood, 2) the extent of condition and extent of cause for the identified issues were understood, and 3) your completed or planned corrective actions were sufficient to address and prevent repetition of the root and contributing causes. The NRC determined that your staff's evaluation identified the primary root and contributing causes for each of the reactor trips that contributed to the white performance indicator. Additionally, the NRC determined that your staff's evaluation ensured the extent of conditions and extent of causes for the reactor trips were understood. The NRC concluded that corrective actions were adequate to prevent repetition of the root and contributing causes. In accordance with IMC 0305, "Operating Reactor Assessment Program," the Unplanned Scrams per 7,000 Critical Hours performance indicator will continue to be considered as a white Action Matrix input until the performance indicator has returned to the green performance band.

Findings

Green: A self-revealing finding was identified for the failure to establish new digital software set points for the load drop anticipatory (LDA) logic circuit associated with an extended power uprate (EPU) digital turbine electro-hydraulic control (EHC) system design modification. Specifically, the software for the LDA logic circuit was programmed to reset at a value that would not be reached during a normal reactor plant shutdown before the turbine control system sensed a loss of load condition and closed the turbine control valves. As a result, during a

planned Unit 3 reactor plant shutdown, the LDA control logic unexpectedly closed the turbine control valves at 25 percent reactor power. The operators then manually tripped the unit based on the indication of loss of turbine load in the control room. Licensee Unit 3 software engineering change (EC) package 246849 change request notice (CRN) 253 Attachment 5, "Turbine Control Initial Values," instructed the programmer to set the LDA disarm value to 50 percent turbine load. Contrary to this instruction, the programmer set the disarm value to 50 pounds per square inch gauge (psig) steam pressure. The failure of the programmer to establish the proper set point value in the LDA reset logic was a performance deficiency.

The performance deficiency was more than minor because it was associated with the equipment reliability attribute of the initiating events cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. The finding was determined to be of very low safety significance (Green) based on Exhibit 1, "Initiating Events Screening Questions," found in Inspection Manual Chapter 0609, Significance Determination Process, Appendix A, "Significance Determination Process for Findings At-Power" (dated June 19, 2012). This was due to the fact that the finding did not result in a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The inspectors determined the cause of this finding was associated with a cross cutting aspect of procedure adherence. Specifically, the licensee set the turbine control valve LDA reset point to 50 psig instead of 50 percent turbine load as prescribed in EC 246849. (H.8) (Section 4OA3.1)

REPORT DETAILS

4. OTHER ACTIVITIES

4OA3 Follow-up of Events and Notices of Enforcement Discretion

.01 (Closed) LER 05000250/2013-007-00 Manual Reactor Trip Due to Generator Load Drop

a. Inspection Scope

On May 10, 2013, Unit 3 was manually tripped in response to a sudden loss of turbine load at approximately 25 percent reactor power. Plant power was being reduced during a planned controlled shutdown in order to perform maintenance on the feed water system. The operating crew manually tripped the reactor due unexpected indications of turbine load reading zero megawatts caused when the turbine control valves closed in response to an unexpected load drop anticipatory safety logic initiation from the turbine control system.

The licensee submitted licensee event report (LER) 05000250/2013-007-00 to the NRC in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual actuation of the reactor protection system including reactor scram or reactor trip. The inspectors reviewed the LER and the licensee's root cause evaluation AR 01873643 to gain a better understanding of the circumstances which led to the manual reactor trip and to verify that the plant systems and operators responded to the event as required. The inspectors evaluated the accuracy of the information submitted in the LER, the licensee's conformance with regulatory requirements, and potential generic implications related to the event. Additionally, the inspectors evaluated the licensee's corrective actions to determine if the actions appropriately addressed the causes that were identified in the licensee's root cause evaluation. The LER is closed.

b. Findings

Introduction: A green self-revealing finding was identified for the licensee's failure to establish new digital software set points for the load drop anticipatory (LDA) logic circuit associated with an extended power uprate (EPU) digital turbine electro-hydraulic control (EHC) system design modification. Specifically, the licensee erroneously programmed the software for the LDA logic to reset at a value that would not be reached during a normal reactor plant shutdown before the turbine control system sensed a loss of load condition and closed turbine control valves. As a result, during a planned Unit 3 reactor plant shutdown, the LDA control logic unexpectedly closed the turbine control valves at 25 percent reactor power. The operators then manually tripped the unit based on the indication of loss of turbine load in the control room.

Description: On May 10, 2013, Unit 3 operators were performing a planned reactor plant shutdown to perform maintenance on the feed water system. At approximately 25 percent reactor thermal power, the operators noticed the turbine generator load unexpectedly go to zero and manually tripped the reactor. The manual reactor trip was uncomplicated and all necessary equipment operated as designed. The LDA is a protective feature for the turbine generator that is designed to actuate when generator megawatt load is less than 20 percent while turbine steam pressure indicates greater than 50 percent load. The circuit is designed to anticipate an over speed condition due to the sudden loss of load to prevent potential damage to the turbine.

On August 17, 2012, the digital EHC modification was completed and tested unsatisfactorily. The licensee determined that the LDA function worked properly; but, the EHC fluid pressure dropped lower than desired and required a logic change to the turbine control valve servo demand signal to ensure full closure of the hydraulic dump valves following an LDA actuation to prevent a turbine trip. The change required a revision to the original design modification package EC 246849 PC/M-08 077, "Turbine Digital Controls Upgrade." The revision was performed under change request EC 246849 CRN 253. The change documentation instructed the programmer to set the turbine control valve LDA reset point to 50 percent turbine load and the programmer mistakenly set the value to 50 psig. The programmer failed to properly validate the units used in the software parameter. This new reset value created a dead band that was too large and did not allow for disarming the logic before reaching the LDA protective circuit logic values. The problem became evident during a planned shutdown when turbine load was reduced per general operating procedures for a controlled reactor plant shutdown. As the operators lowered power, they reached the LDA protective actuation set point before the LDA disarmed. As a result, the LDA circuit sensed a loss of load condition and the turbine control valves automatically closed at approximately 25 percent power reactor thermal power resulting in control room indications of no load on the turbine. The operators manually tripped the unit due to the unexpected turbine load indication going to zero.

The licensee's root cause evaluation (RCE) determined the cause of this event to be the design modification change incorrectly established the reset value for the LDA function when the programmer failed to validate the units used in the program software. The licensee determined that since a value of 50 was the previous reset value, the programmer selected 50 psig as the new reset value versus 50 percent turbine load without checking the proper units were inputted into the program.

This issue was placed in the licensee's corrective action program as action request (AR) 1873643. Corrective actions completed or planned included: developing a digital design guide to ensure engineering quality in digital system projects, correct the Unit 4 LDA reset value, adding indicator lights to the turbine control system display to identify LDA armed status, and perform an extent of condition review for other EPU digital mods.

Analysis: The failure of the programmer to input the proper units used in the Unit 3 LDA reset logic as specified by EC 246849 CRN 253 Attachment 5, "Turbine Control Initial Values," was a performance deficiency. Licensee Unit 3 software change package EC 246849 CRN 253 Attachment 5, Turbine Control Initial Values, instructed the programmer to set the LDA disarm value to 50 percent turbine load. Contrary to this instruction, the programmer set the disarm value to 50 psig. The performance deficiency

was more than minor because it was associated with the equipment reliability attribute of the initiating events cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. The finding was determined to be of very low (green) safety significance based on Exhibit 1, "Initiating Events Screening Questions," found in Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, "Significance Determination Process for Findings At-Power," dated June 19, 2012. This was due to the fact that the finding did not result in a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The inspectors determined the cause of this finding was associated with a cross cutting aspect of procedure adherence. Specifically, the licensee set the turbine control valve LDA reset point to 50 psig instead of 50 percent turbine load as prescribed in EC 246849. (H.8)

Enforcement: This finding does not involve enforcement action because no violation of a regulatory requirement was identified. The licensee entered this issue into the corrective action program as action request (AR) 1873643. Because this finding does not involve a violation and is of very low safety significance, it is identified as a Finding. FIN 05000250/2014008-01, Failure to Properly Program the Turbine Generator Digital Control System Load Drop Anticipatory Circuit Results in a Manual Reactor Trip.

.02 (Closed) LER 05000250/2013-003-00, Manual Reactor Trip due to increasing Reactor Coolant Pump Seal Leakage

a. Inspection Scope

On February 18, 2013, while Unit 3 was operating at approximately 99 percent power, the 3A reactor coolant pump (RCP) No.1 seal leak-off became elevated and erratic. A unit shutdown was commenced on February 18, 2013, at approximately 0055 when seal leak-off increased to 5.5 gallons per minute (gpm). At approximately 0130, the reactor was manually tripped from approximately 72 percent power when seal leak-off flow reached 6 gpm. The inspectors evaluated plant status, mitigating actions, and the licensee's classification of the event. The event was reported to the NRC as event notice (EN) 48764 and documented in the licensee corrective action program as AR 1849104, which included a root cause evaluation. The inspectors discussed the event with operations, maintenance, engineering, and licensee management personnel to gain an understanding of the conditions leading up to the event and assess licensee actions taken following the event. Additionally, the inspectors reviewed the root cause evaluation report to assess the thoroughness of the evaluation and the adequacy of the proposed corrective actions. The licensee's root cause evaluation identified two root causes for this event: 1) The seal runner O-ring was damaged during installation; and 2) The RCP shaft shoulder critical criterion of 60 percent minimum mating surface area was not attained after manual machining (stoning). The inspectors concluded that the licensee's corrective actions to this event were appropriate, including replacing the 3A RCP seal, review of performance of other RCP seals at both Turkey Point units, and revision of the RCP maintenance procedure to provide additional guidance for proper seal installation and post-machining inspections.

The inspectors also verified that timely notifications were made in accordance with 10 CFR 50.72, that licensee staff properly implemented the appropriate plant procedures, and that safety related plant equipment performed as required during the event. The LER is closed.

b. Findings

No findings were identified.

4OA4 Supplemental Inspection (95001)

.01 Inspection Scope

The supplemental inspection was performed in accordance with inspection procedure (IP) 95001 to assess the licensee's evaluation of a white PI which affected the initiating events cornerstone objective in the reactor safety strategic performance area. The white PI is associated with having more than three reactor trips per 7,000 critical hours of plant operation. The inspection objectives were to:

- Provide assurance that the root and contributing causes were understood;
- Provide assurance that the extent of condition and extent of cause were identified; and
- Provide assurance that the licensee's corrective actions were sufficient to address the root and contributing causes and to preclude repetition.

The licensee entered the Regulatory Response Column of the NRC's Action Matrix based on the Unplanned Scrams per 7000 Critical Hours PI crossing the threshold from green to white performance in the first quarter of 2013. The licensee notified the NRC on January 8, 2014, that they were ready for a 95001 supplemental inspection. The four unplanned reactor trips reviewed were:

- February 11, 2013 - A turbine gland sealing steam spillover valve was being bypassed in preparation for calibration of the actuator. Opening the bypass valve created a flow path for gland steam to the condenser, which caused a reduction in gland sealing steam pressure and decrease in main condenser vacuum. Main condenser vacuum reached the turbine trip set point, which caused an automatic reactor trip. (AR 1847369 – Automatic Reactor Trip on Low Condenser Vacuum)
- February 18, 2013 - With the Unit 3 reactor in Mode 1 at approximately 99 percent power, the 3A Reactor Coolant Pump (RCP) No.1 seal leak-off became elevated and erratic. A unit shutdown was commenced on February 18, 2013 at approximately 0055 when seal leak-off increased to 5.5 gallons per minute (gpm). At approximately 0130, the reactor was manually tripped at approximately 72 percent power when seal leak-off flow reached 6 gpm. (AR 1849104 - Elevated #1 Seal leak-off from 3A RCP)

- March 12, 2013 - At approximately 1431 with Unit 3 in Mode 2 at approximately 3 percent rated thermal power, an automatic reactor trip occurred due to a turbine inlet pressure spike during turbine control valve (TCV) testing. (AR 1856035 - PT-3-447 "At Power Signal")

- May 10, 2013 - Unit 3 reactor was manually tripped in response to a sudden loss of turbine load at approximately 25 percent reactor power. Plant power was being reduced during a controlled shutdown for planned maintenance. The operating crew observed generator megawatts suddenly reduced to zero, with no operator action. The crew manually tripped the reactor. (AR 1873643 - Generator Load Drop)

In addition to the root cause evaluations for each reactor trip, the inspectors reviewed common cause evaluation AR 1858641. This investigation evaluated all four reactor trips to identify any similarities with the reactor trips, and identify additional actions needed to reduce reactor trips. The inspectors reviewed the root and contributing causes as well as the corrective actions taken or planned for all four reactor trips. The inspectors also held discussions with licensee personnel to ensure that the 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. Determine that the evaluation identifies who (i.e. licensee, self-revealing, or NRC), and under what conditions the issue was identified

The inspectors determined that the licensee's evaluations of these unplanned reactor trips appropriately determined who and under what conditions the issues were identified.

All four reactor trips were classified as self-revealing events.

b. Determine that the evaluation documents how long the issue existed, and prior opportunities for identification

On February 11, 2013, a field operator was sent to hang a clearance on the Unit 3 turbine gland sealing steam spillover control valve CV-3-3725 for maintenance. While executing the clearance the spillover bypass valve 3-90-005 was over throttled creating a flow path for gland steam to condenser. Pressure in the gland steam header was lost and air entered the low pressure turbines through the gland seals. Vacuum in the condenser began to lower and corresponding alarms were received in the control room. Within approximately five minutes, the condenser low vacuum turbine trip set-point was reached, automatically tripping the turbine and then reactor. The licensee determined that the event was caused by ineffective operational standards. Specifically, the use of a clearance to direct throttling the spillover bypass valve (rather than an operating procedure) was inappropriate. The licensee also determined that operating procedure, 3-NOP-89.01, did not provide adequate direction for bypassing the spillover control valve. The issue was determined to be a self-revealing green finding and was

documented in NRC inspection report 05000250/2013004-03 (ADAMS Accession No. ML13304A619). The licensee determined that there were no prior opportunities for identification.

On February 18, 2013, with the Unit 3 reactor in Mode 1 at approximately 99 percent power, the 3A reactor coolant pump (RCP) No.1 seal leak-off became elevated and erratic. A unit shutdown was commenced on February 18, 2013, at approximately 0055 when seal leak-off increased to 5.5 gpm. At approximately 0130, the reactor was manually tripped at approximately 72 percent power when seal leak-off flow reached 6 gpm. Unit 3 was shutdown to make repairs. During seal inspection and replacement activities, the pump shaft landing where the #1 seal runner sits was found out of tolerance and required repairs. The 3A RCP seal was rebuilt and the unit was returned to service. The licensee determined that there were no prior opportunities for identification.

On March 12, 2013, at approximately 1431, Unit 3 experienced an automatic reactor trip from approximately 3 percent power. The turbine was offline and undergoing testing following # 3 turbine control valve (TCV) position indication repair. Post-maintenance testing and calibration was being performed on the newly installed valve position indicator while the # 3 control valve was incrementally exercised from fully closed to fully open. During the final checks of the testing, the #3 TCV was being opened from full closed to full open when turbine first stage pressure on pressure transmitter (PT) 3-477 spiked high causing indicated turbine power to exceed the P-7 set point (10 percent power) which enabled the “At Power Trips” on the reactor protection system (RPS). With an input into RPS for the turbine trip (i.e., two-of-two turbine stop valves closed) already met and the P-7 interlock satisfied, the RPS logic actuated and caused the reactor trip. The licensee determined that there were no prior opportunities for identification.

On May 10, 2013, Unit 3 reactor was manually tripped in response to a sudden loss of turbine load at approximately 25 percent reactor power. Plant power was being reduced during a controlled shutdown for planned maintenance. The operating crew observed generator megawatts suddenly reduced to zero, with no operator action. The crew manually tripped the reactor. The licensee determined that there were no prior opportunities for identification.

The inspectors determined that the licensee appropriately identified how long the above discussed conditions existed and any prior opportunities for identification.

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

The licensee evaluated the risk significance impact (increase in core damage frequency) of having four unplanned reactor trips as 7.6 E-08 per year.

The inspectors reviewed the licensee’s assessment of the plant-specific risk consequences of the unplanned reactor trips and determined it to be adequate.

d. Findings

No findings were identified.

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

a. Determine that the problems were evaluated using systematic methods to identify root causes and contributing causes

The inspectors noted that the licensee used combinations of different systematic methods to identify root and contributing causes for the four unplanned reactor trips:

- Data gathering through interviews and document review
- Events and causal factor analysis
- Barrier analysis
- Cause and effect diagramming
- Support/refute methodology
- Fault tree analysis
- Safety culture evaluation

Additionally, the inspectors determined that the methods used were appropriate to the technical complexity of the issues evaluated.

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

For the four reactor trips, the inspectors determined that the root cause evaluations were of sufficient detail to support the identified root and contributing causes and were commensurate with the significance of the problem.

For the February 11, 2013, reactor trip, the licensee determined the root cause of the trip to be ineffective implementation of operational standards, as demonstrated by improper monitoring of plant parameters during manipulation of the spillover bypass valve and utilizing an equipment clearance in lieu of an operating procedure when bypassing the gland seal spillover valve. A contributing cause was determined to be poor execution of the work order screening process.

For the February 18, 2013, reactor trip, the licensee determined that there were two root causes for the trip. The first root cause was the seal runner O-ring was damaged during installation. The second root cause was the RCP shaft shoulder critical criterion of 60 percent minimum mating surface area was not attained after manual machining (stoning).

For the March 12, 2013, reactor trip, the licensee determined that the direct cause of the event was the unexpected pressure spike resulting from a quick opening of the No. 3 turbine control valve (TCV) of sufficient magnitude to satisfy the P-7 interlock with the TCVs closed. The root cause was identified as a failure to recognize the risk associated with TCV testing to cause a pressure transient on PT-3-446/447 of sufficient magnitude

to cause a reactor trip while cycling No. 3 turbine control valve (TCV). Specifically, the potential for a pressure spike to reach ten percent indicated turbine power (the point where at-power trips are enabled) was not recognized.

For the May 10, 2013, reactor trip, the licensee's RCE determined the cause of this event to be the design modification change incorrectly established the reset value for the LDA function when the programmer failed to validate the units used in the program software. The licensee determined that since a value of 50 was the previous reset value, the programmer selected 50 psig as the new reset value versus 50 percent turbine load without checking the proper units were inputted into the program. A contributing cause was determined to be that the human factor evaluation did not address the removal (without replacement indication) of the LDA armed lights.

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

The inspectors determined that each of the root cause evaluations for the four unplanned reactor trips had adequately considered prior occurrences of the problem and knowledge of prior operating experience.

d. Determine that the root cause evaluation addressed the extent of condition and the extent of cause of the problem

The inspectors determined that the evaluations for each unplanned reactor trip adequately addressed extent of condition and extent of cause. The inspectors also noted that the licensee implemented corrective actions to address issues identified by the extent of condition or extent of cause analyses.

In addition, the inspectors reviewed the licensee's common cause evaluation which was performed to evaluate commonalities between the four unplanned reactor trips.

e. Determine that the root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in IMC 0305

The inspectors determined that the safety culture components were appropriately considered and reviewed for all four unplanned reactor trips.

f. Findings

No findings were identified.

02.03 Corrective Actions

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

The inspectors determined that appropriate corrective actions were established to address each of the root and contributing causes for all four unplanned reactor trips.

For the February 11, 2013, reactor trip, the licensee implemented corrective actions to revise plant procedure 3/4-NOP-089.01, “Turbine Gland Seals and High Pressure Cylinder Heating,” to include guidance for bypassing spillover valves; implement an improvement plan to reinforce operational standards; perform a review of bypass valves of control valves in the gland seal and cylinder heating systems that do not have existing procedural guidance for being placed in-service, and develop procedural guidance to control this action; and brief appropriate operations personnel on proper identification of control room deficiencies during screening of work orders.

For the February 18, 2013, reactor trip, the licensee implemented corrective actions that include replacing the 3A RCP seal, review of performance of other RCP seals at both Turkey Point units, and revision of the RCP maintenance procedure to provide additional guidance for proper seal installation and post-machining inspections.

For the March 12, 2013, reactor trip, the licensee’s corrective actions to address this event includes the following procedure changes for both units:

- Procedure changes to require MSIV s and turbine stop drain valves to be closed when testing TCVs in Modes 2 or 3 with reactor trip breakers closed.
- Procedural precautions identifying that TCV testing can lead to turbine inlet pressure spikes, and reactor trip if the P-7 interlock is enabled with the turbine latched and reactor trip breakers closed.
- Revision of the post maintenance testing procedure to ensure that the main steam header is depressurized prior to cycling a TCV.

For the May 10, 2013, reactor trip, the licensee implemented corrective actions to reduce the dead band of the LDA pressure arming set point and to add indicator lights to the turbine control system display to identify armed status.

The inspectors also reviewed the licensee’s common cause evaluation which was performed to evaluate the four reactor trips for any commonalities. The licensee did not identify any specific common cause that covers all of the events.

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

The inspectors determined that the corrective actions for the events were appropriately prioritized relative to their risk significance and regulatory compliance.

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

The inspectors determined that the corrective actions for the events have been completed or reasonably scheduled.

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

The inspectors determined that effectiveness reviews had been completed or were scheduled for the causes of the four unplanned reactor trips. Additionally, the inspectors determined that each effectiveness review had quantitative or qualitative criteria established to measure success.

e. Determine that the corrective actions planned or taken adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable

The NRC did not issue an NOV to the licensee. Therefore, this inspection requirement is not applicable.

f. Findings

No findings were identified.

02.04 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

The inspectors determined this issue did not meet the IMC 0305 criteria for treatment as an old design issue.

4OA6 Meetings, Including Exit

.01 Exit Meeting Summary

On March 7, 2014, the inspectors presented the inspection results to Mr. Conboy and other members of the licensee's staff. The inspectors confirmed that no proprietary information was obtained during the course of the inspection.

.02 Regulatory Performance Meeting Summary

On March 7, 2014, a regulatory performance meeting was held with Mr. Conboy and the licensee's staff to review the performance deficiencies and the proposed corrective actions.

ATTACHMENT: SUPPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:
J. Alvarez, Performance Improvement (PID)
V. Barry, Operations, Senior Reactor Operator
J. Cuan, Nuclear Analyst (PID)
T. Conboy, Plant General Manager
P. Czaya, Licensing
C. Domingos, Engineering Director
M. Kiley, Site Vice-President
D. Sluzka, Work Controls Manager
B. Stamp, Training Manager
R. Tomonto, Licensing Manager
M. Wayland, Operations Director

NRC personnel:
D. Rich, Chief, Reactor Projects Branch 3, Division of Reactor Projects Region II

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000250/2014008-01	FIN	Failure to Properly Program the Turbine Generator Digital Control System Load Drop Anticipatory Circuit Results in a Manual Reactor Trip (Section 4OA3.01)

Closed

05000250/2013-007-00	LER	Manual Reactor Trip Due to Generator Load Drop (Section 4OA3.01)
05000250/2013-003-00	LER	Manual Reactor Trip due to increasing Reactor Coolant Pump Seal (Section 4OA3.02)

LIST OF DOCUMENTS REVIEWED

Procedures
PI-AA-01, Corrective Action Program and Condition Reporting, Rev 3
PI-AA-100-1005, Root Cause Analysis, Rev 5
PI-AA-100-1006, Common Cause Evaluation, Rev 4
PI-AA-100-1007, Apparent Cause Evaluation, Rev 5

ARs
1692001, Unexpected Alarm U3: AN-A-1/5 RCP Seal Leakoff Hi Flow
1847369, Automatic Reactor Trip due to Low Condenser Vacuum
1849104, Unit 3 Reactor was shutdown from Mode 1, Full Power operation due to elevated #1 Seal Leak-off flow from the 3A Reactor Coolant Pump

1856035, Reactor Trip Due to PT-3-447 “At Power Trip Signal”
1873643, Manual Reactor Trip due to Generator Load Drop
1858641, NRC Performance Indicator, Unit 3 NRC PI is 4.4 unplanned scrams per 7000 critical hours, which exceeds the threshold for entry into WHITE of >3.

Miscellaneous
PTN Operations Step Change in Performance Plan
LER 50-250-2013-002-00, Automatic Reactor Trip due to Low Condenser Vacuum
LER 50-250-2013-003-00, Manual Reactor Trip due to increasing Reactor Coolant Pump Seal Leakage
LER 50-250-2013-005-00, Automatic Reactor Trip and AFW actuation due to Turbine Inlet Pressure Spike
LER 50-250-2013-007-00, Manual Reactor Trip due to Generator Load Drop