

Susquehanna 1

4Q/2014 Plant Inspection Findings

Initiating Events

Significance:  Sep 30, 2014

Identified By: NRC

Item Type: FIN Finding

RRP Trip due to Incorrect Calibration of MG Set High Temperature Trip Setpoint

A finding of very low safety significance (Green) for inadequately implementing work instructions for the installation and calibration of the reactor recirculation pump (RRP) motor-generator (MG) set motor winding cooling air outlet temperature switch was self-revealed when the Unit 1 'B' RRP tripped on August 27, 2014, requiring a rapid unplanned downpower and transition to single loop operation. The cause of the RRP trip was a calibration error made on May 7, 2014, in which the alarm and trip setpoints were reversed such that the pump trip occurred at expected temperatures for the plant conditions. PPL's immediate corrective actions included entering the issue into their corrective action program (CAP) as CR-2014-27243 and correcting the calibration error.

The inspectors determined that PPL's failure to implement a work order (WO) as written or make changes as required by station procedures was a performance deficiency (PD) that was within PPL's ability to foresee and correct and should have been prevented. The PD was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected its objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, inadequate implementation of work instructions as directed resulted in the incorrect calibration of the 'B' RRP MG set high temperature trip setpoint so that it was reached during normal operations, resulted in a trip of the 'B' RRP, that required an unplanned rapid downpower to approximately 30 percent, and establishment of single loop operating conditions. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "SDP for Findings At-Power," Exhibit 1 for the Initiating Events cornerstone. The inspectors determined the finding was of very low safety significance (Green) because it did not cause a reactor trip and the loss of mitigation equipment. This finding was determined to have a cross-cutting aspect in the area of Human Performance, Field Presence, because PPL did not ensure supervisory and management oversight of work activities, including contractors and supplemental personnel. Specifically, supervisory oversight of the calibration activity, including work package development, review of work performed and work package closeout, was insufficient to ensure that the changes made to the work package were processed in accordance with station procedures and did not result in a new deficiency being introduced [H.2].

Inspection Report# : [2014004](#) (*pdf*)

Mitigating Systems

Significance:  Dec 31, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Risk Management Actions Not Implemented

The inspectors identified a Green NCV of Title 10 Code of Federal Regulations (CFR) 50.65(a)(4) due to multiple

examples of not assessing and managing the increase in risk from online maintenance activities. Specifically, on November 12, 2014, a risk assessment did not identify a Yellow online risk condition during a residual heat removal system (RHR) outage. Additionally, the inspectors identified multiple examples where PPL did not implement the procedural requirements of OI-013-002, "Fire Risk Management," NDAP-QA-1902, "Integrated Risk Management," and NDAP-QA-0340, "Protected Equipment Program" such that adequate risk mitigation actions were performed. Immediate corrective actions were taken and PPL documented the issues in condition report (CR) 2014-35235 and 2014-35270.

The inspectors determined the performance deficiency (PD) was more than minor because it adversely impacted the protection against external factors attribute of the Mitigating Systems cornerstone objective to ensure the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors evaluated the finding using IMC 0612 Appendix K, "Maintenance Risk Assessment and Risk Management SDP."

The inspectors and the Region I Senior Risk Analyst (SRA) used Appendix K, Flowchart 2, "Assessment of Risk Management Actions (RMAs)," and determined that not implementing the appropriate RMAs was of very low safety significance (Green). The basis for this determination was that the short duration of the actual planned maintenance activities (62 hours and 40.5 hours) associated with the RHR Train 'B' unavailability results in a mid E-9 calculated incremental core damage probability (ICDP), using the Susquehanna Unit 2 standardized plant analysis risk (SPAR) Model, Revision 8.21, and Systems Analysis Programs for Hands-on Integrated Reliability Evaluations (SAPHIRE) 8. In accordance with Appendix K guidance, doubling the estimated ICDP value to reflect not implementing RMAs is a reasonable approximation of the increased risk. The resultant low E-8 ICDP deficit remains below the ICDP E-6 deficit Green-White threshold and screens this PD to Green.

The finding was determined to have a cross-cutting aspect in the area of Human Performance, Work Management, in that, PPL did not control and execute activities, consistent with nuclear safety, by managing risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, PPL did not recognize an elevated risk category and incorporate all RMAs into its work activities [H.5]. (Section 1R13)

Inspection Report# : [2014005](#) (*pdf*)

Significance:  Dec 31, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

EPA Breaker Underfrequency Setpoint Drift

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," for PPL not establishing design control measures that provide for verifying or checking the adequacy of design and translating the design basis requirements into allowable values and trip set points. Specifically, PPL did not establish measures to assure the under frequency trip set point on the electrical protection assemblies (EPA) for the reactor protection system (RPS) were correctly translated into design specifications. PPL took immediate corrective actions to perform calibration of all EPA under frequency setpoints and document the condition under CR 2014-28492 and 2014-37665.

The PD was determined to be greater than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the capability of the system that respond to initiating events to prevent undesirable consequences (i.e., core damage). The item is similar to example 3.j in NRC IMC 0612, Appendix E, "Examples of Minor Issues." This example states, in part, that it is not minor if the engineering calculation error results in a condition where there is now reasonable doubt on the operability of a system or component. The inspectors evaluated the finding in accordance with NRC IMC 0609, Attachment 4, "Initial Characterization of Findings," Table 2, "Cornerstones Affected by Degraded Condition or Programmatic Weakness," and determined it affected the Reactivity Control Systems Degraded subsection of the Mitigating Systems cornerstone. Per IMC 0609, Appendix A, "SDP for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions," sub-paragraph C, the inspectors and a Region 1 SRA determined that a detailed risk evaluation was

needed to assess the safety significance of this finding. Based upon the detailed risk evaluation, this finding was determined to be Green.

The finding was determined to have a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, in that PPL did not thoroughly evaluate issues to ensure resolutions address causes commensurate with their safety significance. Specifically, PPL did not thoroughly investigate and evaluate the causes of EPA under frequency set point drift outside the technical specification (TS) allowable values after three EPAs under frequency trip set points drifted below the TS allowable value in 2013 [P.2]. (Section 40A3)

Inspection Report# : [2014005](#) (pdf)

Significance: N/A Dec 31, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Submit an LER

Inspectors identified a Severity Level IV NCV of 10 CFR 50.73 (a)(2)(v) for PPL staff not submitting an Licensee Event Report (LER) within 60 days of discovery of a condition that could have prevented the fulfillment of the safety function of the RPS Electrical Power Monitoring System. PPL submitted an LER for the subject condition and entered the issue into their CAP under CR-2014-17112.

The finding was evaluated using the traditional enforcement process because not accurately reporting events has the potential to impact or impede the regulatory process. The finding was determined to be a Severity Level IV violation of 10 CFR 50.73 (a)(2)(v) based on example 6.9.d.9 of the NRC Enforcement Policy. This example states that a licensee failing to make a report required by 10 CFR 50.73 is an example of a Severity Level IV violation.

Because this violation involves the traditional enforcement process and does not have an underlying technical violation that would be considered more-than-minor, inspectors did not assign a cross-cutting aspect to this violation in accordance with IMC 0612, Appendix B. (Section 40A3.3)

Inspection Report# : [2014005](#) (pdf)

Significance:  Jun 21, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Take Timely and Appropriate Corrective Actions to Address Carbon Steel Pipe Wall Thinning in the RHRSW and ESW Systems

The inspectors identified a Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for PPL's failure to take adequate corrective actions for a condition adverse to quality involving the emergency service water (ESW) and residual heat removal service water (RHRSW) systems. Specifically, PPL did not take timely and appropriate corrective actions to address carbon steel pipe wall thinning on the B ESW and B RHRSW discharge piping on the lower level of the ESW pump house. PPL completed immediate corrective actions including cleaning

the affected piping, conducting ultrasonic testing (UT) thickness testing of the affected piping, calculating acceptance criteria for the UT tests (minimum wall thickness), and calculating a degradation rate of the piping given worst case historical corrosion and water in the environment. Additional actions included initiation of multiple condition reports (CR) to enter the issues into the corrective action program (CR-2014-18803, CR-2014-18945, CR-2014-18932), and plans to add the piping to the PPL Pipe Corrosion Program (PCP) for trending and future examination consideration.

The finding is more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, the wetting and associated external corrosion of the piping without appropriate monitoring could adversely impact the structural integrity of the B RHRSW and ESW headers. In

addition, the finding is similar to the example 3.i in Inspection Manual Chapter (IMC) 0612 Appendix E, “Examples of Minor Issues,” because PPL had to perform calculations to assess whether the actual wall thickness met minimum structural integrity requirements. In accordance with IMC 0609, “Significance Determination Process,” Attachment 4, “Initial Characterization of Findings,” Table 2, “Cornerstones Affected by Degraded Condition or Programmatic Weakness,” inspectors determined this performance deficiency affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, “The SDP for Findings At-Power,” Exhibit 2, “Mitigating Systems Screening Questions,” issued June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the finding does not represent an actual loss of function of one or more non-Tech Spec Trains of equipment designated as high safety-significant in accordance with PPL’s maintenance rule program for greater than 24 hours. The inspectors determined that this finding had a human performance cross-cutting aspect related to Consistent Process because PPL did not use their decision making process consistently to re-evaluate decisions to ensure they remained appropriate when previous decisions were called into question. Specifically, despite repeated identification of pipe wetting conditions and observations of worsening corrosion, plant personnel did not re-evaluate structural integrity. Additionally, plant personnel used an inconsistent approach in dealing with the issue, as was demonstrated by the difference in treatment to prevent corrosion on the A train of the RHRSW and ESW systems.

Inspection Report# : [2014009](#) (*pdf*)

Significance: G Jun 21, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Conduct Timely Initial Operability Determinations

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for PPL’s failure to complete and document initial operability determinations in a timely manner in accordance with station procedures. Specifically, station personnel failed to complete and document initial operability determinations in a timely manner, consistent with PPL procedure NDAP-QA-0703, “Operability Assessments and Requests for Enforcement Discretion,” Revision 24. In response to this issue, PPL issued Operations Directive 14-01 to reiterate the expectation that operations complete the initial operability screening within eight hours or the end of shift, whichever is shorter, as delineated in NDAP-QA-0703. Additionally, the station continues to conduct Periodic Operability Review Meetings to review a sample of operability determinations for consistency with NDAP-QA-0703. The station entered this issue into the corrective action program as condition reports 2014-18806 and 2014-19008 for further evaluation.

This finding is more than minor because if left uncorrected, the continued performance of untimely initial operability determinations could become a more significant safety concern. Specifically, the failure to assess operability in a timely manner can lead to exceeding technical specification allowed completion times and required actions, up to and including required plant shutdowns. Additionally, this issue is similar to items 3.j and 3.k in IMC 0612, Appendix E, “Examples of Minor Issues.” Given the duration of time the deficiency has existed, combined with the number of examples identified during the inspection, the inspectors considered this issue to be programmatic. In accordance with IMC 0609, “Significance Determination Process,” Attachment 4, “Initial Characterization of Findings,” Table 2, “Cornerstones Affected by Degraded Condition or Programmatic Weakness,” inspectors determined this performance deficiency affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, “The SDP for Findings At-Power,” Exhibit 2, “Mitigating Systems Screening Questions,” issued June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) since question A.1 was answered ‘Yes’ because the performance deficiency did not result in the loss of operability or functionality of any structure, system, or component. Additionally, the inspectors did not identify any instances where an untimely initial operability screening resulted in exceeding a TS allowed outage time. The inspectors determined that this finding had a Human Performance cross-cutting aspect related to change management. In this case, PPL revised procedure NDAP-QA-0703 in March 2013 to change the guidance on

timeliness without executing a change management plan to determine if the organization would be able to adhere to the more restrictive guidelines given that other corrective actions were in place to increase the required documentation for an initial operability determination. The inspectors determined that this finding had a human performance cross-cutting aspect related to Change Management. In this case, PPL revised procedure NDAP-QA-0703, in March 2013, to change the guidance on timeliness without executing a change management plan to determine if the organization would be able to adhere to the more restrictive guidelines given that other corrective actions were in place to increase the required documentation for an initial operability determination.

Inspection Report# : [2014009](#) (*pdf*)

Significance:  Jun 21, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Correct Condition Adverse to Quality Related to Fatigue Stress in ESW Supply Lines to RHR Pump Motor Oil Cooler

The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Actions,” because PPL did not take measures to promptly correct an identified condition adverse to quality associated with the Emergency Service Water (ESW) supply lines to the 1C, 1D, 2C, and 2D Residual Heat Removal (RHR) pump motor oil coolers. PPL entered these conditions into their CAP as CR-2014-20129 and is continuing to evaluate corrective actions. Based on PPL’s evaluation conducted in CR-2014-20129, that the ESW and RHR systems will perform their required safety functions and compensatory measures are in place to limit and monitor the pipe vibration, the inspectors determined that the noncompliance does not present an immediate safety concern.

The finding is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. Additionally, it was similar to example to 4.a in IMC 0612 Appendix E, “Examples of Minor Issues,” in that PPL had several opportunities to perform engineering evaluations on this condition and later evaluation determined that safety-related equipment was adversely affected. Specifically, no engineering evaluations were performed from 2009 through 2012, and post-2012 engineering evaluations did not fully bound the condition. Analysis performed after

NRC identification resulted in additional evaluation and compensatory actions being implemented under CR 2014-20129. In accordance with IMC 0609, “Significance Determination Process,” Attachment 4, “Initial Characterization of Findings,” Table 2, “Cornerstones Affected by Degraded Condition or Programmatic Weakness,” inspectors determined this performance deficiency affected the Mitigating Systems Cornerstone. Using IMC 0609, Appendix A, “The SDP for Findings At-Power,” Exhibit 2, “Mitigating Systems Screening Questions,” issued June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) since question A.1 was answered ‘Yes’ because the deficiency only affected the qualification of the ESW and RHR systems, but the ESW and RHR systems maintained operability. The inspectors determined that this finding had a human performance cross-cutting aspect related to Conservative Bias because PPL failed to use decision making-practices that emphasized prudent choices over those that are simply allowable. Specifically, PPL was relying on a leak-before-break assumption to support the continued operability of the safety related piping to the RHR pump motor oil coolers without sufficient priority to correct the condition adverse to quality.

Inspection Report# : [2014009](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Significance:  Dec 31, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Emergency Preparedness Drill Critique Did Not Identify a Risk-Significant Planning Standard Weakness

The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50.54(q)(2) for failing to follow and maintain an emergency plan that meets the requirements of appendix E and the planning standards of 10 CFR 50.47(b). Specifically, PPL did not identify and critique a weakness related to a risk significant planning standard during their critique following the July 24, 2014, emergency preparedness drill, as required by 10 CFR 50.47(b)(14) and Appendix E, Section IV(F)(2)(g).

The inspectors determined that PPL did not identify and critique an emergency preparedness drill performance weakness in the formal critique was a performance deficiency that was within PPL's ability to foresee and correct and should have been prevented. Specifically, PPL did not identify that a periodic update notification provided to the offsite response organizations (OROs) was inaccurate in that it stated an airborne radiological release was in progress when one was not occurring. The inspectors determined the performance deficiency was more than minor because it was associated with the emergency response organization performance attribute of the Emergency Preparedness cornerstone and affected the cornerstone objective (Training, Drills, Exercises) to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. Specifically, PPL's did not effectively identify and critique an emergency preparedness drill performance weakness caused a missed opportunity to identify and correct a drill-related performance deficiency. The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012. The attachment instructs the inspectors to utilize IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," issued September 26, 2014, when the finding is in the licensee's Emergency Preparedness cornerstone. The inspectors determined this finding was a critique finding, the drill scope was full scale, the planning standard was a risk-significant planning standard, and the performance indicator opportunity was a success because periodic update notifications to the OROs are not credited as performance indicator (PI) opportunities using the guidance provided in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. Therefore, using Figure 5.14-1, "Significance Determination for Critique Findings," the inspectors determined the finding was of very low safety significance (Green).

The cause of the finding has a cross-cutting aspect in the area of Human Performance, Consistent Process, because PPL did not use a consistent, systematic approach when making decisions. Specifically, PPL personnel did not use a consistent approach when evaluating and critiquing the accuracy of all notifications provided to the OROs [H.13]. (Section 1EP6)

Inspection Report# : [2014005](#) (pdf)

Significance:  Jun 21, 2014

Identified By: NRC

Item Type: VIO Violation

Failure to take Action to Restore Degraded Emergency Action Level Scheme

The inspectors identified a Green cited violation of 10 CFR 50.54(q)(2) for PPL's failure to follow and maintain an emergency plan that meets the requirements of the planning standards in 10 CFR 50.47(b), in that, since October 2003, PPL did not follow and maintain a standard emergency classification and action level scheme. Specifically, PPL did not take timely corrective actions to provide an adequate means to measure temperature in nine out of 21 areas, where reactor building temperatures are considered for the fission product barrier degradation emergency action levels (EALs). As a result, this deficiency adversely affected PPL's ability to classify an emergency such that a Site Area

Emergency would be declared in a degraded manner. The violation is being cited because PPL has failed to restore compliance or demonstrate objective evidence of plans to restore compliance at the first opportunity in a reasonable period of time following discussion in a formal exit meeting on January 24, 2014 and documented in NRC Inspection Report 05000387;388/2013005 on February 14, 2014.

The finding is more than minor because it is associated with the Facilities and Equipment attribute of the emergency preparedness cornerstone, and adversely affected the cornerstone objective of ensuring that a licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. Specifically, the continuing lack of installed temperature instrumentation or any other compensatory measures and the reliance on personnel dispatched to take temperature readings were insufficient to ensure a timely and accurate EAL classification could be made. Using IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process", section 5.4, the finding is of very low safety significance (Green) because the finding was determined to be an example of an ineffective EAL initiating condition, such that a Site Area Emergency would be declared in a degraded manner.

The inspectors determined that this finding had a problem identification and resolution cross-cutting aspect related to Resolution because PPL did not take corrective actions in a timely manner nor did they take appropriate interim corrective actions to mitigate the issues while more fundamental causes are being assessed. Specifically, PPL had no corrective actions planned or taken to address the degraded EALs until NRC approval of their new EAL scheme, currently scheduled to be implemented no earlier than December 2015.

Inspection Report# : [2014009](#) (*pdf*)

Occupational Radiation Safety

Public Radiation Safety

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

Significance: N/A Jun 21, 2014

Identified By: NRC

Item Type: FIN Finding

Biennial Problem Identification and Resolution (PI&R) Inspection Summary

The inspectors concluded that PPL Susquehanna, LLC (PPL) was generally effective in identifying, evaluating, and

resolving problems. PPL personnel identified problems and entered them into the corrective action program at a low threshold. However, the inspectors noted several examples of missed identification of conditions adverse to quality during the onsite weeks of inspection and throughout the two year period. The inspectors identified one violation for the failure to identify and correct significant piping corrosion.

The inspectors concluded that, although PPL Susquehanna, LLC (PPL) had developed adequate program procedures for identifying, evaluating, and resolving problems; there were several continuing weaknesses associated with the implementation of certain aspects of PPL's corrective action program. Specifically, based on the samples reviewed, the inspectors concluded that PPL did not consistently prioritize and evaluate issues commensurate with the safety significance of the identified problem, as described in the documented weaknesses in evaluations of operability. The inspectors identified two violations and two documented observations in this area. Specifically, the inspectors identified programmatic weaknesses in the timely completion of operability evaluations and the failure to identify and correct the effects of excessive vibrations and water hammer events in a safety related system. In addition, the inspectors noted that causal analyses did not always appropriately consider the extent of condition or previous occurrences of the issue, such as the documented examples for alarms during High Pressure Coolant Injection (HPCI) surveillance testing and corrective actions for emergency operating procedure deviations.

Based on the sample reviewed, the inspectors determined that PPL had several weaknesses in the areas of efficacy and timeliness of corrective actions. Of note, the inspectors identified issues with corrective actions to address the sample of NRC non-cited violations, and findings since the last biennial problem identification and resolution inspection. The inspectors identified one violation for the continuing failure to restore compliance for a degraded condition related to EAL implementation.

The inspectors concluded that PPL adequately identified, reviewed, and applied relevant industry operating experience to Susquehanna operations. In addition, based on those items selected for review, the inspectors determined that PPL's self-assessments and audits were adequate.

Based on the limited interviews the inspectors conducted over the course of the inspection, observations of plant activities, and reviews of individual corrective action program and employee concerns program issues, the inspectors did not identify any indications that site personnel were unwilling to raise safety issues nor did they identify any conditions that could have had a negative impact on the site's safety conscious work environment.

The inspectors took action to ensure that the scope of this problem identification and resolution inspection did not overlap the upcoming 95002 inspection at Susquehanna, currently scheduled for July 2014. The limited review of safety culture was performed in accordance with Inspection Procedure 71152 requirements, and the inspectors did not review any of the root or apparent causes related to the affected performance indicators subject to further 95002 inspection.

Inspection Report# : [2014009](#) (*pdf*)

Last modified : February 26, 2015