

Susquehanna 2

3Q/2014 Plant Inspection Findings

Initiating Events

Significance:  Mar 31, 2014

Identified By: NRC

Item Type: FIN Finding

Reactor Scram due to Loss of Reactor Feed Pumps

A finding of very low safety significance (Green) for failure to implement work instructions for an engineering change to the Integrated Control System (ICS) was self revealed when Unit 2 lost control of reactor vessel level on September 14, 2013, requiring insertion of a manual scram. The cause of the loss of level control was determined to be a coding error in the ICS that resulted in the improper transition of feedwater control modes during a reactor shutdown. PPL's immediate corrective actions included entering the issue into their corrective action program (CAP) as condition report 1746169, correcting the coding error, and performing an extent of condition review of the ICS code to ensure no additional errors were present.

The performance deficiency 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 shutdown as well as power operations. Specifically, the failure to implement work instructions associated with the engineering change resulted in an ICS logic code error which caused a loss of reactor feed requiring a manual reactor scram. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "The 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 both 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, Work Management because PPL did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority, including the identification and management of risk commensurate to the work. Specifically, the work instructions associated with the engineering change lacked the specificity commensurate with the complexity of the work such that it could be accomplished without error. [H.5] Inspection Report# : [2014002](#) (*pdf*)

Significance:  Oct 04, 2013

Identified By: NRC

Item Type: FIN Finding

Reactor Scram due to Loss of Integrated Control System

A finding of very low safety significance (Green) for failure to evaluate and incorporate the operating experience PPL received regarding the integrated control system (ICS) was self-revealed when Unit 2 lost control of reactor vessel level on November 9, 2012, requiring insertion of a manual scram. The cause of the loss of level control was the lockup of one of the two ICS network core switches due to a data storm, a condition which had been described in various operating experience communications from April 2007 through September 2012. PPL's immediate corrective actions included entering the issue into their corrective action program as condition report 1640540, making changes to Unit 2's core switches to prevent a similar condition, and developing a procedure to allow operators to diagnose and respond to a similar condition in Unit 1.

The performance deficiency is 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 shutdown as well as power operations. Specifically, in this case, had the

operating experience been reviewed appropriately, compensatory actions could have been taken that would have reasonably prevented the scram with loss of main feedwater. The inspectors evaluated the finding in accordance with IMC 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 1, for the Initiating Events cornerstone. The Senior Reactor Analyst (SRA) used the SSES Standardized Plant Analysis Risk (SPAR) model, Revision 8.16, for Unit 2 and SAPHIRE 8 to conduct the detailed risk evaluation and determined the increase in core damage frequency (?CDF) for internal initiating events was $5E-7$ yr (Green). Specifically, to account for the increased chance for a loss of main feedwater, the initiating event frequency was increased by one order of magnitude. Additionally, model modifications were made to account for the plant specific depressurization strategy. The dominant sequence was a loss of main feedwater with a failure of all injection coupled with a failure to vent containment and control residual heat removal (RHR). The increase in risk from both external events and for a large early release was found to be negligible. This finding was determined to have a cross-cutting aspect in the area of Corrective Action Program, Operating Experience (OE), because PPL staff did not systematically collect, evaluate, and communicate to affected internal stakeholders in a timely manner relevant internal and external OE. Specifically, PPL did not enter the vendor advisories into the station's OE program and therefore, management was unaware of the core switch issues, no formal evaluation was conducted, and no corrective actions were specified to mitigate the vulnerability. [P.2(a)]

Inspection Report# : [2013011](#) (*pdf*)

Mitigating Systems

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:  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

Significance:  Jun 30, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify Conditions Adverse to Quality due to Untimely Actions to Address Extent of Condition

An NRC-identified Green NCV of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for PPL's failure to identify conditions adverse to quality by not implementing timely actions to address the extent of a previously identified inoperable condition. Specifically, when a

reactor core isolation cooling (RCIC) turbine exhaust line vacuum breaker failed its inservice test, PPL did not take timely actions in accordance with NDAP-QA-0702, "Action Request and Condition Report Process," to test other valves that could be susceptible to the failure mechanism and, therefore, did not identify conditions adverse to quality in similar valves in a timely manner. PPL entered the issue into the corrective action program (CAP) as condition report (CR) 2014-17151 and tested all other susceptible valves. Additionally, degraded conditions that were identified were corrected prior to restoring the systems to service.

The finding was determined to be more than minor because it was associated with the structures, systems, and component (SSC) and barrier performance attribute of the Barrier Integrity cornerstone and affected its objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Inspectors determined the risk significance was bounded by the failure of the high pressure coolant injection (HPCI) turbine exhaust line vacuum breaker, which was stuck in a partially opened state. With the valve stuck in this state, failure of the redundant valve would have resulted in HPCI exhaust steam relieving directly to the suppression chamber air space affecting containment performance. The inspectors assessed the finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, and determined the finding to be of very low safety significance (Green) because it did not represent a degradation of the barrier function of the control room, did not represent an actual open pathway in the physical integrity of reactor containment, and did not involve the actual reduction in function of hydrogen igniters in containment. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because PPL did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, despite properly identifying appropriate corrective actions while evaluating the extent of a condition adverse to quality, PPL failed to implement those actions in a timely manner resulting in the failure to identify and correct conditions adverse to quality in three similar valves.

Inspection Report# : [2014003](#) (pdf)

Significance:  Dec 31, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Missed Technical Specification Surveillance for Secondary Containment Drawdown Testing

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XI, "Test Control," because PPL did not ensure all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Specifically, PPL's procedure used to implement the requirements of TS Surveillance Requirements (SR) 3.6.4.1.4 and 3.6.4.1.5 did not ensure that secondary containment integrity was tested in all required configurations. PPL's immediate corrective actions included entering the issue into their CAP as CR-2013-03891 and applied a status control tag to the railroad access bay door-101 as an administrative control until corrective actions can be completed and the configuration tested satisfactorily.

The finding is more than minor because it is associated with the procedure quality attribute of the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the inadequate surveillance procedure resulted in missed surveillances for SRs 3.6.4.1.4 and 3.6.4.1.5. Additionally, it was similar to example 3.d in IMC 0612 Appendix E, "Examples of Minor Issues," in that the failure to implement the TS SR as required is not minor if the surveillance had not been conducted. In this case, the surveillance requirement had not been completed for all configurations of secondary containment. In accordance with IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The SDP for Findings At-Power," the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency only represented a degradation of the radiological barrier function provided for the Standby Gas Treatment system. This finding was determined to have a cross-cutting aspect in the area of Human Performance Resources area because the licensee failed to ensure that personnel, equipment, procedures, and other resources are available and adequate to assure nuclear safety. Specifically, those necessary for: complete, accurate and up-to-date design documentation, procedures, and work packages, and correct

labeling of components [H.2(c)]. (Section 1R22)

Inspection Report# : [2013005](#) (*pdf*)

Emergency Preparedness

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*)

Significance:  Dec 31, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Instrumentation to Implement EALs for Fission Product Barrier Degradation

The inspectors identified a Green NCV of 10 CFR 50.54, "Conditions of Licenses," paragraph (q), because PPL did not maintain the Emergency Plan to adequately meet the standards of 50.47(b). Specifically, PPL did not have temperature indication installed in some areas of the reactor building that are required to support assessment and determination of entry conditions into the fission product barrier emergency action levels (EALs). PPL entered this issue into their CAP as CR 1727229.

The inspectors determined that the failure to have temperature indication installed in certain areas of the reactor building was a performance deficiency that was within PPL's ability to foresee and correct. The performance deficiency 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 lack of installed temperature instrumentation and the reliance on local temperature indications were insufficient to ensure a timely and accurate EAL classification could be made. Using IMC 0609, Appendix B, 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 cause of this finding has a cross-cutting aspect in the area of Human Performance Resources because PPL did not ensure that facilities and equipment were adequate and available, including emergency facilities and equipment. Specifically, PPL did not provide temperature instrumentation to operators to ensure a timely and accurate declaration of an emergency for an un-isolable reactor coolant leak in the reactor building. [H.2.d]. (Section 1EP6)

Inspection Report# : [2013005](#) (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 : November 26, 2014