

Susquehanna 1

3Q/2014 Plant Inspection Findings

Initiating Events

Mitigating Systems

Significance: G 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*)

Significance:  Dec 31, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Procedural Guidance for Responding to an Internal Flooding Event in ECCS Rooms

The inspectors identified a Green NCV of Technical Specifications (TS) 5.4.1, "Procedures," because PPL's procedures EO-000-104, "Secondary Containment Control" and ON-169-002, "Flooding in the Reactor Building" were inadequate in that actions directed in the procedures could complicate an internal flooding event and may adversely affect aspects of PPL's flood design. Specifically, the procedures directed operators to enter a flooded room to assess the extent and source of the flooding; an action which could render multiple trains of emergency core cooling system (ECCS) inoperable due to communicating two watertight rooms. In addition to entering the issue into the CAP as Condition Reports (CRs)-2013-02099 and 2013-06417, PPL issued Operations Directive 13-07 which provided guidance to ensure that operators sent to investigate a room flooded alarm will do so in a manner that will not affect redundant trains.

The performance deficiency is more than minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone and affected the objective to ensure the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the procedure to respond to a room flooded alarm was insufficient to ensure operator response would not potentially render multiple trains of ECCS inoperable. The finding was evaluated in accordance with IMC 0609.04, "Initial Characterization of Findings," and Exhibits 2 and 4 of IMC 0609, Appendix A, "The SDP for Findings At-Power." Since opening the watertight door with excessive flooding could bypass the flood protection feature and potentially degrade two or more trains of a multi-train system or function, a detailed risk assessment was performed. The condition was modeled using the Susquehanna standardized plant analysis risk (SPAR) model version 8.19 along with SAPHIRE version 8.09. As a

bounding analysis, the condition was assumed to exist for greater than one year and the flooding was assumed to require a reactor shutdown which results in a plant transient with failure of high pressure coolant injection (HPCI) and core spray (CS) due to flood impacts. The flooding initiating event frequency was estimated to be about 1 in 10,000 years. The resulting change in core damage frequency was substantially less than 1E-7. The dominant sequences included a transient with a loss of all direct current (DC) power and a transient with failures to depressurize and reactor core isolation cooling (RCIC) failures. Since the change in core damage frequency was sufficiently low no further evaluation for large early release was required. The finding is related to the cross-cutting area of PI&R, Self and Independent Assessments, in that PPL did not conduct assessments to identify areas for improvement. In particular, the self-assessments were not of sufficient depth, comprehensive, appropriately objective, or self-critical. Specifically, despite PPL's process requiring periodic verification that event driven procedures are technically and functionally correct, the periodic review completed in April 2013 failed to identify that actions specified in the procedure could invalidate the flood design. [P.3(a)]. (Section 1R06)

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

Barrier Integrity

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