



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I**
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

January 25, 2013

Mr. Timothy S. Rausch
Senior Vice President and Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Boulevard, NUCSB3
Berwick, PA 186303

**SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1 – FOLLOW-UP
SUPPLEMENTAL INSPECTION REPORT 05000387/2012011 WITH
ASSESSMENT FOLLOW-UP LETTER**

Dear Mr. Rausch:

On November 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff completed a follow-up supplemental inspection pursuant to Inspection Procedure (IP) 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," at your Susquehanna Steam Electric Station (SSES), Unit 1. The enclosed inspection report documents the inspection results, which were discussed at the exit meeting on December 14, 2012, with you and members of your staff.

This follow-up supplemental inspection was performed to assess PPL actions to evaluate and implement corrective actions to address a White finding of low to moderate safety significance associated with an internal flooding event at SSES Unit 1 which occurred in the third quarter of 2010. The leak was from a flanged joint in the condenser bay. This White finding was documented in an NRC inspection report dated November 12, 2010, which is publically available in the NRC document control system (ADAMS) under accession number ML103160334.

The NRC previously completed a supplemental inspection in March 2012 to review your actions to address this White finding. Inspection results are documented in an NRC inspection report dated May 7, 2012 (Reference ML12125A374). At that time the NRC staff determined PPL's actions to address this White finding were not sufficient and that collectively, the issues represented a significant weakness as described in NRC inspection procedure 95002. Specifically, PPL's review of extent of condition regarding fastener torque checks of flanged joints was not adequate and PPL had not made sufficient progress on its procedure upgrade project for the NRC to evaluate its effectiveness. Accordingly, the NRC did not close the White finding and identified the need to complete additional inspection after PPL staff had addressed the extent of condition concerns, made sufficient progress on the procedure upgrade project and informed the NRC staff of their readiness for further inspection. PPL staff informed the NRC of their readiness for this inspection on October 16, 2012, and inspectors completed their onsite reviews November 26 – November 30, 2012.

The objectives of this follow-up supplemental inspection were: 1) to determine whether PPL had made sufficient progress on the procedure quality upgrade project and assess whether those actions were effective; and 2) to determine whether PPL had appropriately evaluated and implemented corrective actions to affirm an adequate extent of condition review regarding torque checks on gasketed flanges of other plant equipment. The inspection consisted of examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and the conditions of your operating license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based upon the results of this inspection, the NRC determined that PPL's extent of condition reviews and progress on the procedure upgrade project were sufficient and appropriate to address the identified significant weakness as documented during the initial supplemental inspection report (Inspection Report 05000387/2012008). Additionally, no findings of significance were identified as a result of this inspection. As such, the NRC determined the inspection objectives of Inspection Procedure 95002 have been satisfied and the White finding (FIN) 05000387/2010004-01 is closed. Per Inspection Manual Chapter (IMC) 0305, the White finding was closed in the fourth quarter of 2012 with the conduct of the inspection exit meeting on December 14, 2012. Accordingly, Unit 1 returned to the Licensee Response Column of the IMC 0305 Action Matrix in the first quarter of 2013.

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

Sincerely,

/RA/

Darrell J. Roberts, Director
Division of Reactor Projects

Docket No.: 50-387
License No.: NPF-14

Enclosure: Inspection Report 05000387/2012011
w/Attachment: Supplemental Information

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Sincerely,
/RA/
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 Division of Reactor Projects

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 w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-387

License No.: NPF-14

Report No.: 05000387/2012011

Licensee: PPL Susquehanna, LLC (PPL)

Facility: Susquehanna Steam Electric Station (SSES) Unit 1

Location: Berwick, Pennsylvania

Dates: November 26 - 30, 2012

Inspectors: Brice Bickett, Senior Project Engineer, Division of Reactor Projects
Philip McKenna, Resident Inspector, Salem Nuclear Generating Station

Approved By: Darrell J. Roberts, Director
Division of Reactor Projects
Region I

Enclosure

SUMMARY OF FINDINGS

IR 05000387/2012011; 11/26/2012 – 11/30/2012; Susquehanna Steam Electric Station, Unit 1; Follow-up Supplemental Inspection – Inspection Procedure (IP) 95002.

The report covered an on-site inspection by two region-based inspectors. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

The NRC performed this supplemental inspection in accordance with IP 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," to assess PPL's actions to evaluate and implement actions to address a White finding regarding an internal flooding event with low to moderate safety significance (White) which occurred in the third quarter of 2010 and was documented in NRC inspection report (IR) finding 05000387/2010004-01, "Procedural Inadequacies Result in Reactor Scram and Loss of Normal Heat Sink." The initial NRC 95002 supplemental inspection (IR 05000387/2012008) conducted, in part, to review this White finding regarding the internal flooding event concluded PPL had significant weaknesses and corrective actions that were not sufficient to address the White finding at that time. Consistent with Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program," Section 11.01(e), this follow-up supplemental inspection specifically focused on the areas of significant weaknesses as documented in NRC supplemental inspection report 05000387/2012008.

The inspectors did not identify any new significant weaknesses in regard to PPL's actions to address the White finding. The inspectors concluded that PPL had implemented adequate corrective actions and made sufficient progress in applicable areas to address the significant weaknesses previously documented in the initial NRC 95002 supplemental inspection report. Additionally, PPL's overall actions with regard to the procedure upgrade project and related procedure quality use and adherence (PQU&A) actions appeared to be appropriate with the current structure and management commitment and focus. No findings of significance were identified as a result of this supplemental inspection. Notwithstanding the above, the inspectors made some observations regarding implementation of the procedure upgrade project and related PQU&A initiatives.

The inspection objectives of IP 95002 have been satisfied and the White finding is closed. Per IMC 0305, the White finding is considered closed in the fourth quarter of 2012 with the completion of the on-site inspection exit meeting on December 14, 2012. Susquehanna Unit 1 returned to the Licensee Response Column of the IMC 0305 Action Matrix in the first quarter of 2013.

Other Findings

None

REPORT DETAILS

4. OTHER ACTIVITIES

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

(Closed) LER 05000387/2010-003-02: Unit 1 Manual Reactor Scram due to Leakage from the Unit 1 Circulating Water System and Subsequent Flooding of the Unit 1 Condenser Bay

On July 16, 2010, PPL operators manually scrammed the Unit 1 reactor due to a large unisolable circulating water (CW) system leak in the main condenser area. All control rods fully inserted as designed. Reactor water level lowered to -28 inches causing Level 3 (+13 inches) isolations. The non-safety related Integrated Controls System (ICS) for feedwater control detected the scram condition and automatically entered the setpoint setdown mode, which placed the non-lead reactor feed pumps (RFPs) in idle mode, and initiated transition to the startup level control mode. During this transition, ICS feedwater level control did not transfer to single element control due to a higher than expected steam flow signal, and concurrent feedwater flow oscillations resulted in an increase in reactor water level. Reactor water level reached Level 8 (+54 inches) which resulted in the trip of all three RFP turbines, the high pressure coolant injection (HPCI) system, and the reactor core isolation cooling (RCIC) system to shutdown. Reactor water level was subsequently restored by operators and maintained within normal operating range using the RCIC system. The CW system was shut down and the main steam isolation valves (MSIVs) were manually closed. Pressure control was initiated using the HPCI system in the pressure control mode. All safety systems operated as expected. No steam relief valves opened. PPL estimated that approximately one million gallons of non-contaminated circulating water leaked into the turbine building condenser bay area.

PPL personnel determined the cause of the unisolable CW system leak was due to the condenser waterbox manway gasket rolling out of position. PPL's investigation concluded that the gasket reached the point where it could no longer maintain system pressure and rolled out of position due to gasket creep (i.e., inadequate gasket preload to maintain joint integrity). The gasket extrusion was the result of inadequate preload, rather than a system pressure transient or a material defect. Corrective actions taken for Unit 1 included inspection and replacement of manway gaskets.

PPL personnel determined the root causes were less than optimal system manway and isolation valve design, less than adequate risk informed decision making which resulted in the failure to adequately address previous CW system leaks, and inadequate PQU&A which resulted in the loss of CW pressure boundary integrity and inadequate mitigation of the CW leak. PPL personnel implemented short term corrective actions which included but not limited to revising procedures to address gasket installation procedure deficiencies, revising procedures to address isolating individual waterboxes, and developing revisions to processes and procedures to improve risk informed decision making.

There are no new NRC violations identified associated with review of this LER. The NRC previously issued a White finding (FIN 05000387/2010004-01) regarding PPL's performance aspects associated with this event. Additionally, the NRC initially held

open this White finding (IR 05000387/2012008) due to significant weaknesses identified during the 95002 supplemental inspection procedure regarding PPL's extent of condition review and corrective action implementation. This LER is closed.

4OA4 Follow-Up Supplemental Inspection (95002)

.01 Inspection Scope

This follow-up supplemental inspection was conducted in accordance with Inspection Procedure (IP) 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area." This inspection follows up on a supplemental inspection completed and documented in IR 05000387/2012008 dated May 17, 2012 that maintained a White finding open related to an internal flood condition that occurred in 2010 at SSES Unit 1.

NRC Inspection Manual Chapter (IMC) 0305, Section 11, "Additional Action Matrix Guidance," paragraph 01(e), in part, requires that if a finding is being held open because of the results of a previous supplemental inspection, then the scope of the additional supplemental inspection shall be limited to only the inadequacies discussed in the initial supplemental inspection report. The inadequacies documented in NRC supplemental IR 05000387/2012008 were collectively considered by the NRC staff to constitute a significant weakness that resulted in the decision by the NRC to hold the White finding open. Based on those inadequacies, the scope of this inspection is as follows:

- 1) To determine whether PPL had appropriately evaluated and implemented corrective actions to affirm an adequate extent of condition review, as it relates to the internal flooding event regarding torque checks of gasketed flanges on other plant equipment; and
- 2) To determine whether PPL had made sufficient progress on the procedure quality upgrade project and assess whether those actions appear to be effective.

.01.01 Background

Note - The July 2010 internal flooding event details are summarized previously in this report, Section 4OA3.

SSES Unit 1 entered the Regulatory Response Column of the NRC's Action matrix in the third quarter of 2010 as a result of one inspection finding of low to moderate safety significance (White). The finding was associated with PPL's maintenance procedure, which contained inadequate condenser waterbox gasket installation instructions. On July 16, 2010, the condenser manway gasket rolled out of position, resulted in a large leak, an internal flooding event, a manual reactor scram, and loss of the normal heat sink. The finding was characterized as having low to moderate safety significance (White) based on the results of a Phase 3 risk analysis performed by a region-based senior reactor analyst, as discussed in NRC IR 0500387/2010004, dated November 12, 2010. The failure was attributed to inadequate maintenance procedures which caused insufficient torque applied to the condenser manway bolts, and insufficient preparation of the gasket surfaces. The procedures directly associated with the event were corrected, and the gaskets for all Unit 1 condenser manways were replaced prior to plant restart.

In addition to the reactor scram from the July 2010 internal flooding event, SSES Unit 1 also experienced unplanned reactor scrams in April 2010, May 2010 and January 2011. This resulted in the SSES Unit 1 performance indicator (PI) for Unplanned Scrams per 7000 Critical Hours exceeding the Green to White threshold (i.e., greater than three unplanned scrams). SSES Unit 1 entered the Degraded Cornerstone column of the NRC's Action Matrix in the first quarter of 2011 based on the White finding and White PI inputs which both had low to moderate safety significance and impacted the Initiating Events Cornerstone.

During February and March 2012, the NRC staff performed a supplemental inspection in accordance with IP 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," to assess PPL's evaluation associated with the internal flooding event and the four individual scram events which resulted in the White PI and subsequent transition of SSES Unit 1 to the Degraded Cornerstone Column of the NRC Action Matrix. While the NRC supplemental inspection team determined that sufficient actions had been implemented to address and close the White PI, the team also determined that PPL did not adequately address the White finding associated with the internal flooding event. Although the team determined that portions of PPL's problem identification, root cause evaluations (RCEs), and corrective actions for the White finding associated with condenser bay flooding were adequate, the inspectors identified that PPL's initial assessment of the extent of condition were narrowly focused as it did not include a sampling of other gaskets that could have been similarly affected by inadequate maintenance procedures as the condenser manways. The team determined that PPL's extent of condition review should have also considered leaks that may have existed prior to the PPL implementing corrective actions for the inadequate maintenance procedures. Finally, because PPL's efforts to upgrade station procedures as part of extent of cause actions were not scheduled to start until April 2012, the adequacy of the procedure upgrade efforts, and therefore substantive corrective actions to address extent of cause, could not be evaluated by the NRC staff by the conclusion of the inspection in March 2012.

The initial NRC supplemental inspection team, based on the above, determined that PPL actions taken or planned to correct the issue did not provide the assurance level required to meet the inspection objectives defined in the IP 95002 for closing the White finding. Taken collectively, these issues were considered to represent significant weaknesses as described in IP 95002, and as such, the White finding FIN 05000387/2010004-01, "Procedural Inadequacies Result in Reactor Scram and Loss of Normal Heat Sink," remained open pending follow-up inspection to verify that: (1) the concerns regarding the licensee's extent of condition evaluations for inadequate procedures used to torque gasketed flanges were appropriately addressed and that adequate corrective actions were identified and implemented; and (2) SSES has developed and implemented an adequate procedure quality upgrade project.

.02 Evaluation of the Inspection Requirements

.02.01 Problem Identification

- a. Determine that the evaluation documented who identified the issue (i.e. licensee-identified, self-revealing, or NRC-identified) and under what conditions the issue was identified

No significant weaknesses were documented in supplemental inspection report (IR) 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

- b. Determine that the evaluation documented how long the issue existed and prior opportunities for identification

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

- c. Determine that the evaluation documented the plant-specific risk consequences, as applicable, and compliance concerns associated with the issue(s) both individually and collectively

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

- d. Findings

No findings of significance were identified.

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

- a. Determine that the problem was evaluated using a systematic methodology to identify the root and contributing causes

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

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

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

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

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

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

- (1) Extent of condition reviews regarding inadequate procedures used to torque gasketed flanges:

Summary of NRC supplemental inspection team assessment (March 2012)

PPL staff completed three root cause evaluations (RCEs) for the internal flooding event. Each of the RCEs addressed extent of condition and extent of cause, and assigned corrective actions based on the identified extent of condition and extent of cause. Recognizing deficiencies associated with its initial and second root cause evaluations and extent of condition reviews, PPL personnel performed a third, supplemental RCE which broadened the extent of condition to include all leaking flanged gaskets. Notwithstanding, the initial NRC supplemental team determined the extent of condition review actions still contained weaknesses. For example, a corrective action plan (CAP) database search performed as part of the supplemental evaluation covered a broad period of time and revealed 82 potential flange leaks. However, a subsequent CAP database search conducted by PPL personnel only covered a nine-month period following the October 2010 reactor building chiller leak and identified 12 flange leaks. As such, the NRC determined this review did not consider leaks that may have existed prior to the licensee implementing corrective actions for the inadequate maintenance procedures, which now required a second torque check to account for gasket relaxation and creep during operations. In addition, the initial supplemental NRC inspection team identified that torque checks of selected flanges on other plant equipment were not included as part of the extent of condition. Ultimately, these two performance aspects contributed to the NRC determination that PPL's assessment of the extent of condition for inadequate torque on flange bolts was narrowly focused and did not include torque checks of a sufficient sample of gasketed flanges on other plant equipment.

NRC follow-up supplemental inspection team assessment (December 2012)

Overall, the inspectors determined that PPL's subsequent corrective actions for the extent of condition contribution to the significant weakness, as identified in the initial 95002 supplemental inspection, were adequate.

The inspectors reviewed PPL's corrective actions for the extent of condition contribution to the significant weakness identified in the initial 95002 supplemental inspection. Subsequent to the 95002 inspection, station personnel implemented additional extent of condition actions which included pressure boundary leakage from bolted joints in plant systems. PPL personnel reviewed 118 Action Requests (ARs) related to leaks which covered the timeframe from January 1, 2009 to March 31, 2012. PPL personnel conducted a common cause analysis on these leaks and determined that less than adequate maintenance - human performance, was the common cause, because preventable leaks occurred at approximately 12 bolted flange connection leaks. PPL also investigated a potential trend involving leaks at the station based upon an increase of trend data for the second quarter 2012. PPL personnel evaluated the data and did not identify a specific trend during the time period. However, station personnel did note an increase in CAP items tagged with the leak trend code which coincided with the station's introduction of risk informed screening in December 2011. PPL personnel identified no additional corrective actions from the completion of the common cause analysis that were not already identified in the root cause evaluations (RCE) and supplemental RCE conducted for internal flooding event.

The inspectors reviewed PPL's corrective action for not conducting torque checks of other gaskets that could have been affected by inadequate maintenance procedures. PPL staff had originally determined that no action was required to check flanges that were not leaking, even though they may have been similarly impacted by the inadequate maintenance procedures. During the NRC's supplemental inspection, PPL initiated actions based on inspector observations, to perform breakaway torque checks during the performance of station maintenance in order to evaluate the population of affected flanges. This included a prompt check of a random sample of as-found bolted flange connections and then over a period of several months, a broader sample of as-found torque data. The sample of flange connections included joints that did and did not have one-hour retorquing performed. The broader sample of as-found data was based on flanged connections that were scheduled to be worked during work weeks from May to September 2012. As-found torque checks were conducted by maintenance personnel on these flanges before the flanges were disassembled for the planned maintenance. PPL's assessment of the results of these torque checks concluded that no potential trends or inadequate torque issues existed.

The inspectors reviewed the results of the gasketed flange torque checks and conducted plant walkdowns of many of the flanges that were checked as part of the extent of condition review. The inspectors also conducted interviews with station personnel to ensure that the extent of condition evaluations were understood and evaluated properly. The inspectors determined that PPL staff had adequately evaluated the extent of condition, but observed a missed opportunity to conduct gasketed flange torque checks during the Unit 1 refueling outage which began on March 31, 2012 or in the 16-day Unit 2 forced outage in May 2012 or the 14-day Unit 1 forced outage in June 2012. These opportunities would have allowed PPL staff to conduct the torque checks earlier and covered some equipment that is not normally accessible when the plant is operating. However, based on the broad range of sampling that was completed, the inspectors determined this enhancement did not adversely affect PPL's determination that no potential trends or inadequate torque issues existed. PPL staff entered this observation into the corrective action program (CR 1647482).

- (2) Extent of cause actions to implement a station procedure upgrade project:

Summary of NRC supplemental inspection team assessment (March 2012)

PPL personnel identified, as part of their extent of cause, actions to upgrade station procedures, in part, to address procedure inadequacies that contributed to the internal flooding event. However, at the time of the supplemental inspection, PPL personnel had not yet implemented substantive actions to upgrade procedures. As a result, the NRC inspection team could not effectively evaluate the adequacy or effectiveness of future actions to address the extent of cause regarding procedure inadequacies.

This performance aspect contributed to the NRC's determination that PPL's implementation of extent of cause corrective actions, specifically focused on implementation of a station procedure upgrade project was not adequate.

NRC follow-up supplemental inspection team assessment (December 2012)

Overall, the inspectors determined that PPL's corrective actions to implement a procedure upgrade project (PuP) for the extent of cause contribution to the significant

weakness, identified in the initial supplemental inspection, were adequate. The inspectors also determined that related actions with regard to procedure quality and use and adherence (PQU&A) initiatives appeared effective and are appropriate; although, the inspectors acknowledged that the PuP and PQU&A initiatives are a multi-year station effort.

The inspectors identified PPL personnel initiated actions to address process and knowledge gaps that existed in station procedures which did not meet industry standards. PPL staff benchmarked the industry and revised station procedures NDAP-QA-0002, "Procedure Program;" NDAP-QA-0004, "Procedure Change Process;" and NDAP-QA-0008, "Procedure Format and Content," to address key procedure program and process gaps that did not meet industry standards and contributed to inadequate procedure quality, including the procedure shortcomings specific to the internal flooding event. The inspectors' review primarily focused on the station's corrective actions with regard to (1) implementation of a procedure upgrade project group to develop new procedures and (2) implementation of a site procedure group to revise procedures in-use at the station until complete revision to the new procedure standards is accomplished.

PPL established a PuP group whose primary focus is to completely revise procedures to the upgraded station standards. The inspectors noted that the PuP resources are primarily composed of experienced contractors trained to the new standard. The station also supplemented this new procedure effort with a number of trained station personnel when situations and resources warranted. At the completion of this inspection, approximately 326 upgraded procedures were issued. Of those procedures, approximately 85 of those were ranked as high risk procedures. A number of procedures completed in 2012 (not initially categorized as high risk) were re-prioritized for early completion by the station based on other priorities not directly quantifiable by risk but considered important to safe operations. For example, some general maintenance procedures such as the motor operated valve maintenance procedure, not considered high risk, were re-prioritized by the station because that procedure may impact a number of safety systems. Additionally, a number of chemistry procedures (not categorized as high risk) were completed as PPL took advantage of resource efficiencies combined with procedures that involve less complex technical upgrades and reviews. The inspectors also identified that PPL had an additional 103 procedures drafted but remained in various stages of technical review and validation. Of those procedures in draft, 44 of those procedures are considered high risk by the station's risk ranking methodology. The inspectors noted that dedicated contractor resources within the same organization structure/model are in-place for 2013 with approved budget resources that support continuation of the project in 2014 - 2016. Currently, while 2013 PuP PIs are still being developed, PPL expects to complete a majority of the high risk procedures by the end of 2013.

PPL established, organized and implemented a new site procedure group (SPG) organization whose primary focus is the central point for the administration of the site's procedure program to ensure continuing compliance with station and industry procedure standards. The inspectors observed that this group provides necessary actions to address current procedure deficiencies when identified by station personnel as procedures are used. The inspectors acknowledged that the PuP is a multi-year project and the SPG provides on-going corrective action response to procedure inadequacies since a majority of procedures remain to be revised to the new standard. The inspectors

identified PPL has established metrics and prioritized workload associated with procedure backlogs to monitor SPG efforts to address current procedure deficiencies.

In addition to the above procedure improvement efforts, PPL implemented use and adherence initiatives to ensure PPL staff identify procedure problems in the course of daily plant activities. The inspectors identified that PPL personnel revised and upgraded NDAP-QA-0029, "Procedure Use Standards and Expectations," and conducted training for all station personnel and 2012 spring outage personnel on the station expectations. Additionally, PPL has increased management and supervisor in-field and paired observations as documented and analyzed via the ObservationWay program. PPL staff developed performance indicators to monitor and assess the initiation rates by department of condition report actions/problems with regard to procedures. The inspectors observed indications of increased effectiveness of PPL's efforts to identify procedure quality issues. This was based upon an increase of approximately 55% in the initiation rate of CRs identifying procedure issues in 2012 as compared to 2011. Lastly, while still in the early stages, PPL continues to develop a new management model which will include upgraded station administrative procedures consistent with the station's benchmarking of other plants.

The inspectors determined there was adequate and reasonable progress accomplished on the procedure upgrade project since April 2012 especially when considering the number of potential distractions posed by planned and unplanned plant shutdowns. Further, the inspectors concluded the organizational structure, management and resource dedication, and process and procedure improvements thus far would provide for continued success assuming continued focus and management attention. Based on review of condition reports and personnel interviews, the inspectors determined PPL personnel have checked and adjusted the upgraded procedure process based on initial implementation learnings and station personnel feedback. The upgraded procedure process used to draft, review, and validate upgraded procedures appears rigorous with the appropriate cross-discipline and work group reviews and inputs. Based on interviews with PPL staff, the inspectors concluded completed upgraded procedures are of good quality with positive station response. This qualitative insight is also supported by a sample of independent reviews that were conducted by the inspectors on upgraded procedures.

Nonetheless, the inspectors made some key observations regarding 2013 procedure improvement planned actions that would further support station efforts to implement an effective and sustainable procedure upgrade project going forward.

- The inspectors identified the prioritization and procedure selection methodology used in 2012 should be enhanced to consider other important attributes, in addition to quantifiable risk aspects, to ensure that procedures important to safety are scheduled for revision in a timely manner. In 2012, the station's initial methodology to select procedure priority was limited to a high level risk system selection risk assessment. However, the inspectors identified there did not appear to be a more intrusive, formalized and documented plan on how to select and prioritize the high risk procedures (~700) for completion. Specifically, of the high risk procedures completed in 2012, there was not clear, documented direction or rationale on what procedures in each department were considered most important to upgrade in the initial efforts of the PuP. The inspectors did not identify a violation of regulatory

requirements or station standard that was not met. PPL initiated CR 1647488 to address this observation.

- The inspectors identified there were opportunities for PPL staff to adjust and finalize 2013 performance indicators (PIs) for the procedure upgrade project in relation to monitoring and measuring performance based on progress and lessons learned in 2012. The inspectors acknowledged that PPL had an action in-progress to revise 2012 monitoring PIs at the time of the inspection. The inspectors observed that the 2012 PIs were very high level and focused primarily on output numbers with regard to the PuP. A more effective PIs would be one that better measures expectations in 2013 and considers performance monitoring at the department level with regards to PuP output. Additionally, the inspectors identified there are opportunities to implement measures that monitor corrective action program data for trend assessment information with regard to quality of the new procedures being issued. The inspectors did not identify a violation of regulatory requirements or station standard that was not met in this regard.
- The inspectors identified PPL management had not been timely in permanently staffing the Site Procedure Group consistent with their revised NSP-AD-0004, "Conduct of Site Procedure Group." The inspectors determined the SPG is a critical group whose function assures the station resolves and addresses current procedure issues in parallel with the PuP output. At the time of the inspection, the inspectors acknowledged PPL management was finalizing most permanent personnel decisions in the operations and maintenance groups of the SPG. However, the inspectors identified that the station was still working through the approach for balance of plant staffing in the SPG and did not have a corrective action assignment tracking the timeliness expectation for completion of this action. The inspectors were provided information that indicated during the interim decision on how the station would approach the balance of plant group, procedures were being revised and updated consistent with station requirements in this area. PPL initiated CR 1646687 to address this observation. The inspectors did not identify a more than minor performance deficiency in this regard.

e. Findings

No findings of significance were identified.

02.03 Corrective Actions

- a. Determine that appropriate corrective actions are specified for each root and contributing cause or that the licensee has an adequate evaluation for why no corrective actions are necessary

Summary of NRC supplemental inspection team assessment (March 2012)

The March 2012 NRC inspection team highlighted aspects of inadequate corrective action performance by PPL to implement sufficient corrective actions to address the extent of condition and cause concerns as summarized previously in this report [Section 02.02d (1) & (2)]. The March 2012 NRC inspection team concluded those corrective actions assigned to address the extent of condition and extent of cause for this event were not adequate and contributed to the NRC's determination of a significant

weakness.

NRC follow-up supplemental inspection team assessment (December 2012)

Overall, the inspectors determined that PPL's subsequent corrective actions to address the extent of condition and cause contributions to the significant weakness, identified in the initial 95002 supplemental inspection, were adequate. The specific details of PPL's actions subsequent to the initial 95002 supplemental inspection and NRC's assessment of those actions are documented previously in this report [Section 02.02d (1) & (2)].

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

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

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

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

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

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

- 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 staff did not issue a NOV to PPL; therefore, this inspection requirement was not applicable.

- f. Findings

No findings of significance were identified.

02.04 Independent Assessment of Extent of Condition and Extent of Cause

Summary of NRC supplemental inspection team assessment (March 2012)

The NRC inspection team identified that PPL's extent of condition and extent of cause reviews were inadequate as described previously in this report [Section 02.02d (1) & (2)].

NRC follow-up supplemental inspection team assessment (December 2012)

The inspectors focused their independent reviews on the significant weaknesses

documented in the initial supplemental inspection regarding extent of condition torque checks for gasketed flanges as well as reviewing a number of procedures in the upgraded format. The inspectors reviewed the results and analysis of PPL's gasketed flange torque checks and conducted independent plant and system walkdowns of a sample of flanges for visual indications of leaks or indications of joint make-up problems. This review was also supplemented by corrective action program reviews and discussions with PPL personnel to ensure the extent of condition evaluations were understood and evaluated properly. The inspectors reviewed those upgraded procedures directly attributable, in part, to the 2010 internal flooding event. Additionally, the inspectors sampled a number of upgraded procedures from various departments that had been completed subsequent to the initial NRC supplemental inspection.

The inspectors did not identify any findings or observations in this area. The inspectors concluded that PPL's actions were of reasonable breadth and depth to identify other potential plant equipment, and procedure or human performance issues that may have been impacted by similar performance issues regarding inadequate torque checks and procedure inadequacy.

.02.05 Safety Culture Consideration

No significant weaknesses were documented in supplemental IR 05000387/2012008 in this area. As such, consistent with IMC 0305, the follow-up supplemental inspection team did not re-inspect PPL's performance with regard to this inspection requirement.

4OA6 Meetings

.01 Exit Meeting Summary

The inspectors presented the inspection results to Mr. Tim Rausch and other members of his staff on December 14, 2012. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.02 Regulatory Performance Meeting Summary

Following the December 14, 2012, exit meeting, Mr. Paul Krohn, Chief, Reactor Projects Branch 4 at that time, and the inspection team met with Mr. Tim Rausch and other members of his staff to convene a Regulatory Performance Meeting, in accordance with IMC 0305, "Operating Reactor Assessment Program." Mr. Rausch outlined the corrective actions taken and planned by PPL to address the White finding.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Rausch	Senior Vice President and Chief Nuclear Officer
J. Helsel	Plant General Manager and Acting Site Vice President
K. Cimorelli	General Manager, Nuclear Programs
M. Crowthers	Recovery Team Manager
D. Filchner	Nuclear Regulatory Affairs
J. Jennings	Operations Procedure Group Supervisor
A. Soden	Root Cause Team Lead PQUA
J. Sukal	Procedure Upgrade Project Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

05000387/2010-004-01	FIN	Procedural Inadequacies Result in Reactor Scram and Loss of Normal heat Sink (Section 4OA4)
05000387/2010-003-02	LER	Unit 1 Manual Reactor Scram Due to Leakage from the Unit 1 Circulating Water System and Subsequent Flooding of the Unit 1 Condenser Bay (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Root/Apparent Cause Analyses

CR 1282128, Condenser Bay Flood Manual Scram RCAR, September 16, 2010
 CR 1318800, NRC White Finding RCAR, February 10, 2011
 CR 1389530, Procedure Quality and Compliance Problems, February 29, 2011
 CR 1389534, Flooding Event/White Finding RCAR, November 18, 2011
 AR 1575201, Common Cause Analysis on Inadequately Restored Pressure Boundary Bolted Joints, November 3, 2012

Procedures

CH-TP-030, Diesel Fuel Oil Sampling, Revision 0
 PPA AP-907-001, Procedure Process Description, Revision 1
 PPA AP-907-005, Procedure Writer's Guide, Revision 1
 MT-043-001, Main Condenser Leak Detection Tube Pulling Waterbox Inspection and Cleaning, Revision 22 (Rev 14)
 MT-116-004, RHR Heat Exchanger 1E205B Drain, Revision 6 (Rev 5)
 MT-GM-015, Torquing guidelines, Revision 27
 MT-GM-050, Limitorque Type SMB 000-4 and Type SB-3 Operator Maintenance, Revision 23 (Rev 22)
 NDAP-QA-0002, Procedure Program, Revision 33

NDAP-QA-0004, Procedure Change Process, Revision 6
 NDAP-QA-0008, Procedure Format and Content, Revision 14 (Rev 8)
 NDAP-QA-0029, Procedure Use- Standards and Expectations, Revision 15
 NDAP-QA-0702, Action Request and Condition Report Process, Revision 38
 NDAP-QA-0752, Cause Analysis, Revision 17
 NDAP-00-0562, Susquehanna SES Skill of the Craft Activities, Revision 2
 NDAP-00-0753, Common Cause Analysis, Revision 1
 NDAP-00-0778, Susquehanna Recovery Closure Review Process, Revision 13
 NSP-AD-0004, Conduct of Site Procedure Group, Revision 2
 OI-AD-055, Operations Procedure and Instruction Writer's Guide, Revision 19
 ON-099-001, Loss of Communication Systems, Revision 0
 ON-100-003, Chemistry Anomaly, Revision 24
 ON-142-001, Circulating Water System Leak, Revision 27
 OP-023-001, Diesel Fuel Oil System, Revision 33 (Rev 32)
 OT-149-005, Flush of RHR Cross Tie Line, Revision 2 (Rev 1)
 SI-024-303, 5 Year Calibration of "C" Diesel Generator Lube Oil Low Pressure Switches
 PSL-03468C1, C2, C3, C4, Revision 10 (Rev 9)
 SI-183-208, Quarterly Functional Test of Reactor Vessel Water Level (Low Low) Level 3 (ADS
 Permissive) Channels LIS-B21-1N042A&B, Revision 17 (Rev 16)
 SM-104-002, 4KV Bus 1A202 24 Month Undervoltage Channel Calibration, Revision 16
 (Rev 15)
 SM-151-001, 24 Month Core Spray Pumps 1A 1P206A and 1C 1P206C Offsite Power Timer
 Relay Testing, Revision 9 (Rev 8)
 SO-116-A02, Quarterly RHRSW Valve Exercising Division 1, Revision 6 (Rev 5)
 SO-158-001, Weekly Manual Scram Control Switch Functional Check, Revision 14 (Rev 13)
 SO-250-001, Monthly RCIC Alignment Check, Revision 18 (Rev 17)

Calculations & Analysis

EC-042-1008, Determine the Minimum Allowable "As-Found" Bolt Torque Value for the
 Condenser Manway, Revision 0

Action Requests

1314219	1446343	1451007	1522203	1533128	1540389
1563911	1575779	1629146			

Condition Reports (*denotes NRC identified during this inspection)

1282128	1332187	1389530	1389534	1413372	1530602
1530608	1530609	1530612	1530614	1530619	1533128
1534633	1538849	1575201	1575202	1610807	1629591
1629592	1629842	1634481	1645522	1646605*	1647146*

Assessments and Audits

1490606, Final Effectiveness Review on Circulating Water Off-Normal Procedure Changes,
 February 17, 2012
 1490610, Interim Effectiveness Review of Maintenance Procedure Man-Way Cover Changes,
 February 14, 2012
 1490616, Effectiveness Review on Maintenance Procedure Man-Way Cover Changes,
 September 12, 2012

1620288, Station Procedure Upgrade Project Assessment, November 5, 2012
1629146, 95002 Re-inspection Extent of Condition/Extent of Cause Objective, November 1,
2012

Miscellaneous

Maintenance and Operations Procedure Group Workdown Curves, November 2012
Procedure Quality and Procedure use and Adherence Performance Improvement Integrated
Matrix (PIIM), 4th Quarter 2012
Recovery Update, Volume 1, Issue 17

LIST OF ACRONYMS

ACE	Apparent cause evaluation
ADAMS	Agency wide Document Access and Management System
AR	Action request
CAP	Corrective action program
CFR	Code of Federal Regulations
CR	Condition report
CW	Circulating water
FIN	Finding
HPCI	High pressure coolant injection
ICS	Integrated controls system
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
LER	Licensee Event Report
MSIV	Main steam isolation valve
NOV	Notice of violation
NRC	Nuclear Regulatory Commission
PI	Performance indicator
PPL	PPL Susquehanna, LLC
PQU&A	Procedure Quality Use and Adherence
PuP	Procedure upgrade project
RCE	Root Cause Evaluation
RCIC	Reactor core isolation cooling
RFP	Reactor feed pump
SDP	Significance determination process
SPG	Site procedure group
SSC	Structure, system, and component
SSES	Susquehanna Steam Electric Station
SW	Service water