July 21, 2005

Mr. Britt T. McKinney
Senior Vice President, and
Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Boulevard - NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC INTEGRATED INSPECTION REPORT 05000387/2005003 AND 05000388/2005003

Dear Mr. McKinney:

On June 30, 2005, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed integrated inspection report presents the results of that inspection, which was discussed with you and other members of your staff on July 14, 2005.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report also documents four findings of very low safety significance (Green). Two of the findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Susquehanna Steam Electric Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room

or from the Publically Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/ Samuel Hansell signing for

Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

Docket Nos. 50-387; 50-388
License Nos. NPF-14, NPF-22

Enclosures: Inspection Report 05000387/2005003 and 05000388/2005003
Attachment: Supplemental Information

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REGION I

Docket Nos.: 50-387, 50-388

License Nos.: NPF-14, NPF-22

Report No.: 05000387/2005003 and 05000388/2005003

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station

Location: 769 Salem Boulevard
Berwick, PA 18603

Dates: April 1, 2005 through June 30, 2005

Inspectors: A. Blamey, Senior Resident Inspector
F. Jaxheimer, Resident Inspector
G. Meyer, Senior Reactor Engineer
N. McNamara, Emergency Preparedness Inspector
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Approved by: Mohamed M. Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

CONTENTS

SUMMARY OF FINDINGS

IR 05000387/2005-003, 05000388/2005-003; 04/01/2005 - 06/30/2005; Susquehanna Steam Electric Station, Units 1 and 2; Refueling and Outage Activities, Temporary Plant Modifications, ALARA Planning and Controls, Identification and Resolution of Problems, and Cross-Cutting Areas.

The report covered a 3-month period of inspection by resident inspectors and announced inspections by a regional senior health physicist, a senior reactor inspector, an emergency preparedness inspector, and two reactor inspectors. The inspectors identified two Green non-cited violations (NCVs) and two Green findings. The significance of most findings are indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC Identified Findings and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. The loss of all cooling to the "B" main transformer and the resulting manual reactor scram on April 28, 2005 uncovered a self-revealing finding of failure to follow the corrective action program procedure. Following transformer replacement modifications, and a review of industry operating experience in 2002, PPL identified that the automatic transfer scheme of the power supplies to the Unit 2 main transformer cooling system contained single-point failure vulnerabilities. A previous loss of all cooling to the Unit 2 "A" main transformer occurred on March 27, 2003 and identified that total loss of transformer cooling could result in a reactor scram. The PPL Corrective Action procedure NDAP-QA-702, requires the implementation of interim corrective actions to prevent recurrence, minimize the problem or mitigate its effects. Contrary to this procedure, PPL initiated no actions to prevent recurrence or mitigate its effects until the identified design vulnerability caused another loss of main transformer cooling which resulted in a reactor scram on April 28, 2005. After the April 28th scram, PPL revised procedures to improve operator response to a total loss of transformer cooling and initiated a high priority modification to remove the design vulnerability.

  This finding is greater than minor because it is associated with the design control and procedure adequacy performance attributes of the Initiating Events cornerstone and the finding negatively affected the cornerstone objective to limit the likelihood of those events that upset plant stability. An SDP Phase 1 risk assessment determined the finding was determined to be of very low significance (Green) since as a transient initiator it did not contribute to the likelihood of mitigation equipment or functions not being available.

  This finding is related to the corrective action category of the Problem Identification and Resolution cross-cutting area because PPL did not take action

on identified problems in accordance with corrective action and work process procedures to implement actions that could prevent recurrence, minimize the problem or mitigate its effects. (Section 4OA2)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a self-revealing non-cited violation of Technical Specifications Section 5.4.1 "Administrative Controls - Procedures," for not correctly pre-planning and implementing a surveillance on the 2D633 battery charger. This resulted in not identifying and correcting a degraded condition which contributed to the failure of the battery charger and subsequent Unit 2 shutdown on April 10, 2005. Following the shutdown, PPL initiated actions to improve the battery charger inspection work plans and preventive maintenance procedures as well as provide improvements in training.

  This finding is greater than minor because the loss of 125 Volt DC battery charger 2D633 affected the Mitigating Systems cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The SDP Phase 1 screening determined that a Phase 2 evaluation was required, because the finding represented an actual loss of a safety function of a single train, for greater than its Technical Specification Allowed Outage Time. A Phase 3 evaluation was performed instead of a Phase 2 evaluation because the Phase 3 evaluation was able to more accurately characterize the risk of this subsystem failure. A Phase 3 Risk Assessment determined this finding to be of very low safety significance (Green).

  The inspectors identified that a contributing cause of this finding is related to the organizational performance category of the Human Performance cross-cutting area because the lack of adequate pre-planed work instructions resulted in maintenance individuals not inspecting all wires in battery charger 2D633 as required by the work instructions. Therefore, the degraded wires were not identified and repaired in March 2005, and as a result the battery charger failed on April 10, 2005. (Section 1R20)

- Green. The NRC identified a non-cited violation for not implementing the Temporary Change procedure, in accordance with Technical Specification 5.4.1.a, "Administrative Controls - Procedures." The temporary change performed in the field resulted in a loss of seismic qualification of the "D" emergency service water (ESW) ventilation subsystem. When this was discovered the "D" ventilation subsystem and the "D" ESW pump were declared inoperable in accordance with the Technical Requirements Manual, Section 3.7.6.E. The inspectors determined that failure to implement the temporary change procedure as required by Technical Specifications caused the loss of the seismic qualification of the "D" ESW ventilation subsystem, which provides cooling for the ESW pumps. PPL declared the "D" ESW ventilation subsystem and the "D" ESW pump inoperable, performed an engineering evaluation (EWR 681288) and approved the use of a special tool to secure and maintain the

seismic qualification of the damper. PPL installed this tool and declared the damper operable on June 7, 2005.

This finding is more than minor because the loss of seismic qualification affected the "Protection Against External Factors" Attribute of the Mitigating Systems cornerstone and the objective of ensuring capability of a system (ESW) that responds to initiating events to prevent undesirable consequences. This finding is of very low safety significance because the qualification deficiency did not result in the loss of function.

The inspectors identified that a contributing cause of this finding was related to the organizational performance category of the Human Performance cross-cutting area because operations and maintenance did not recognize the need to have engineering evaluate the method that was used to secure the damper in accordance with NDAP-QA-1218, "Plant Changes." (Section 1R23)

Cornerstone: Occupational Radiation Safety

- Green. The inspectors identified a self-revealing finding having very low safety significance due to a deficiency in ALARA performance. During the Susquehanna Unit 2 refueling outage (2RI012), rework on the residual heat removal (RHR) F050A and F050B valves resulted in a collective exposure of 17.006 person-rem, against a goal of 6.830 person-rem. This additional collective exposure was principally the result of problems associated with the seat lapping tool and an inability to effectively hydrolaze the work area.

  The performance deficiency was due to an inability to effectively lap the valve seat on the RHR F050A and F050B valves. Susquehanna's three-year rolling average (2001-2003) is below the significance determination process (SDP) criteria of 240 person-rem for boiling water reactors; therefore, overall ALARA performance has been effective and this finding is of very low safety significance.

  The inspectors identified that a contributing cause of this finding was related to the organizational performance category of the Human Performance cross-cutting area because health physics and maintenance personnel did not adequately prepare for the work to be performed, and did not review the documentation and lessons learned of similar work performed in earlier outages. (Section 2OS2)

B. Licensee Identified Violations

Violations of very low safety significance, which were identified by PPL, have been reviewed by the inspectors. Corrective actions taken or planned by PPL have been entered into PPL's corrective action program. These violations and corrective actions are listed in Section 4OA7 of this report.

Report Details

Summary of Plant Status

Susquehanna Steam Electric Station (SSES) Unit 1 began the inspection period at full rated thermal power (RTP) and operated at or near full power during the inspection period except for a reduction to approximately 70% power on May 7, 2005, for a control rod sequence exchange, after which the unit was brought back to full power. Also, on June 25, 2005, the unit was reduced to approximately 73% power to attempt a control rod sequence exchange that was later stopped and the control rod sequence was returned to its original pattern. Unit 1 was returned to full RTP on June 26, 2005.

Unit 2 began the inspection period at full RTP, and continued until April 10, 2005, when the plant was manually shut down after a battery charger failure. The Unit went to Mode 2 during this short outage, and returned to Mode 1 and 100% reactor power on April 16, 2005. On April 28, 2005, Unit 2 was manually shut down again, following a loss of main transformer cooling. The unit returned to 100% power on May 5, 2005, following a short outage. The unit operated this way until June 6, 2005, when it was automatically shut down following a failure of the voltage regulator on the main generator. The unit was shut down until June 13, 2005, after which it operated at 100% RTP until the end of the inspection quarter.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 - 2 Samples)

a. Inspection Scope

Adverse Weather Readiness. During the week of June 9, 2005, the inspectors reviewed PPL's preparations for hot weather. This included a review of open work on the service water system and the reactor building closed cooling water system. The inspectors performed plant walkdowns for the selected structures, systems and components to determine the adequacy of PPL's weather protection and system features for prolonged hot weather. On June 6, 2005, inspectors observed and reviewed operator actions including the entry into the severe thunderstorm and high winds procedure, during a period of high winds which included a tornado warning for the local area. This inspection activity represented two samples. The following documents were reviewed:

- ON-000-002, Severe thunderstorms and high winds (tornado warning)
- ON-000-005, Revision 10, "Hot Weather"
- SO-100-006, "Shiftly Surveillance Operating Log"
- OP-111-001, Revision 19, "Service Water System

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04 - 3 Samples)

a. Inspection Scope

Partial System Walkdowns. The inspectors performed partial system walkdowns to verify system and component alignment and to note any discrepancies that would impact system operability. The inspectors verified selected portions of redundant or backup systems or trains were available while certain system components were out of service. The inspectors reviewed selected valve positions, electrical power availability, and the general condition of major system components. This inspection activity represented two samples. The walkdowns included the following systems:

- "E" and "B" emergency diesel generators (EDG) following failure of the "C" EDG turbocharger
- Unit 1 residual heat removal (RHR) system following isolation of the "B" emergency service water (ESW) loop

Complete System walkdown. The inspectors conducted a detailed review of the alignment and condition of Secondary Containment system. The inspector reviewed operating procedures and system configuration. The inspectors evaluated ongoing maintenance and outstanding condition reports associated with the secondary containment system to determine the effect on system health and reliability. The inspectors also reviewed the 24 month secondary containment draw down and leakage test results (1R22). This inspection activity represented one sample. The documents reviewed during the inspection are listed in the attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 8 Samples)

1. Tour Plant Areas Important to Reactor Safety

a. Inspection Scope

The inspectors reviewed PPL's fire protection program to determine the required fire protection design features, fire area boundaries, and combustible loading requirements for selected areas. The inspectors walked down those areas to assess PPL's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures to assess PPL's fire protection program in those areas. This inspection activity represented eight samples. The inspected areas included:

- Units 1 and 2 diesel "E" building, fire zone 0-41E
- Units 1 and 2 diesel generator building elevation 677 and 710, fire zone 0-41D
- Units 1 and 2 emergency service water area, fire zone 0-51

- Units 1 and 2 emergency service water area, fire zone 0-52
- Unit 1 Division II lower relay room, fire zone 0-24D
- Unit 1 Station Battery Charger rooms, fire zones 0-28B-1, 0-28J, and 0-28M
- Unit 2 Station Battery Charger rooms, fire zones 0-28E, 0-28A-1, and 0-28G
- Unit 2 Remote Shutdown Panel Area, fire zones 2-2A and 2-2C.

b. Findings

No findings of significance were identified.

2. Fire Drill Observations (71111.05A - 1 Sample)

a. Inspection Scope

On June 27, 2005 inspectors observed an announced fire brigade drill in the Unit 2 reactor building remote shutdown room. The fire was a simulated class 'A' fire of staged combustibles near the center of the room. The inspector assessed PPL's strategy to fight a fire in this plant location and the general readiness of PPL to prevent and fight fires.

The inspectors observed the fire brigade member response to the fire area scene to demonstrate that sufficient and proper equipment was available for combating the postulated fire including search and rescue and smoke removal activities. The inspectors observed fire fighting directions, and radio communications between the brigade leader, brigade members, and the control room. The inspectors attended and reviewed the post drill critique to evaluate whether the drill objectives met the acceptance criteria. This inspection activity represented one sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07B - 4 Samples)

1. Biennial Heat Sink Performance

a. Inspection Scope

Based on safety significance and prior inspection history, the inspectors selected the following heat exchangers to evaluate PPL's means (inspection, cleaning, maintenance, and performance monitoring) of ensuring adequate heat sink performance:

- RHR pump 1D motor cooler
- Turbine building closed cooling water (TBCCW) heat exchanger 2E (2E1232B)
- Fuel pool cooling heat exchanger 1E (1E 202C)
- Control structure chiller A (OS117A)

The inspectors assessed the external condition of accessible heat exchangers in the field, reviewed the most recent eddy current, surveillance test and inspection results, and reviewed the applicable system health reports to confirm that results were acceptable and that design basis assumptions for flow rate, plugged tube percentage, and heat transfer capability had been met. The inspectors discussed heat exchanger maintenance practices, including the specifications and procedures used, with the heat exchanger component engineer, applicable system and design engineers, eddy current Level III, and chemistry personnel. The inspectors reviewed the flow balancing test results of the emergency service water (ESW) system performed on September 24, 2004. The inspectors reviewed PPL commitments regarding Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment" to confirm that current inspection, cleaning, and testing practices were consistent with commitments. The inspectors reviewed applicable CRs to confirm that identified problems and degraded conditions had been resolved properly.

Inspectors reviewed the chemical treatment programs for the spray pond (ESW ultimate heat sink) and the cooling tower basin (service water heat sink) to verify that potential bio-fouling mechanisms were being addressed, including on-going treatment and monitoring as specified in the chemistry manual. The review included a walkdown of the spray pond and pump house, and discussions with chemistry personnel and the ESW system engineer. The inspectors noted that current system health can be attributed to PPL's ability to chemically control their ultimate heat sink, the extensive use of stainless steel AL-6XN in tubing, and the experience of involved engineering, testing, and chemistry personnel.

b. Findings

There were no findings of significance identified.

1R11 Licensed Operator Requalification (71111.11Q - 1 Sample)

a. Inspection Scope

Simulator Evaluation

On June 14, 2005, the inspectors observed licensed operator performance in the simulator during operator requalification training. The inspectors compared their observations to Technical Specifications, emergency plan implementation, and the use of emergency operating procedures. The inspectors also evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. This inspection activity represented one sample. The following training scenario was observed:

- Lesson OP-002-05-05-02, Loss of Feedwater Heating and actions to exit the reactor core flux oscillations/instability region.

b. Findings

No findings of significance were identified.

1R12 Maintenance Implementation (71111.12Q - 1 Samples)

a. Inspection Scope

The inspectors evaluated PPL's work practices and follow-up corrective actions for selected system, structure, or component (SSC) issues to assess the effectiveness of PPL's maintenance activities. The inspectors reviewed the performance history of those SSCs and assessed PPL's extent of condition determinations for these issues with potential common cause or generic implications to evaluate the adequacy of PPL's corrective actions. The inspectors reviewed PPL's problem identification and resolution actions for these issues to evaluate whether PPL had appropriately monitored, evaluated, and dispositioned the issues in accordance with PPL procedures and the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed selected SSC classification, performance criteria and goals, and PPL's corrective actions that were taken or planned, to verify whether the actions were reasonable and appropriate. This inspection activity represented one sample. The following issue was reviewed:

Equipment Issue

- Unit 2 battery charger maintenance preventable functional failure (MPFF) on April 10, 2005 and resulting unavailability. (System moved to A1)

Procedures and Documents

- Condition Report # 665179 Root Cause and Action Plan
- Failure Analysis Report # FA 071038-01, Revision 1
- Maintenance Expert Panel Meeting Minutes, 2005-0523
- NDAP-QA-0413, Revision 7, Maintenance Rule Program

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13 - 7 Samples)

a. Inspection Scope

The inspectors reviewed the assessment and management of selected maintenance activities to evaluate the effectiveness of PPL's risk management for planned and emergent work. The inspectors compared the risk assessments and risk management actions to the requirements of 10 CFR 50.65(a)(4) and the recommendations of NUMARC 93-01 Section 11, "Assessment of Risk Resulting from Performance of

Maintenance Activities." The inspectors evaluated the selected activities to determine whether risk assessments were performed when required and appropriate risk management actions were identified.

The inspectors reviewed scheduled and emergent work activities with licensed operators and work-coordination personnel to verify whether risk management action threshold levels were correctly identified. In addition, the inspectors compared the assessed risk configuration to the actual plant conditions and any in-progress evolutions or external events to evaluate whether the assessment was accurate, complete, and appropriate for the emergent work activities. The inspectors performed control room and field walkdowns to verify whether the compensatory measures identified by the risk assessments were appropriately performed. This inspection activity represented seven samples. The selected maintenance activities included:

- Units 1 and 2 failure of “C” EDG during the 24 hour endurance run and substituting “E” EDG for “C” EDG, AR 673923
- Units 1 and 2 replacement of “C” EDG turbo charger during the week of May 16, AR 673923
- Units 1 and 2 Division II emergency service water logic system functional test, SE-054-001B, D yellow risk
- Units 1 and 2 Division II emergency service water thruwall leak, isolation of “B” loop ESW to Unit 1 reactor building, yellow risk
- Unit 2, AR 665179, “Failure of “C” Battery Charger
- Unit 2, AR-RISK 665521 (Red), “Substitution of Portable Battery Charger for “A” Battery Charger
- Unit 2, high pressure coolant injection surveillance, 2B control rod pump and “C” emergency diesel generator out-of-service

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14 - 3 Samples)

a. Inspection Scope

For the non-routine events described below, the inspectors witnessed operator actions as they were performed in the control room, and reviewed operator logs, plant computer data and strip charts to determine what occurred. Inspectors determined that system response was in accordance with the design basis and that operator response was in accordance with plant procedures. This inspection activity represented three samples.

- Unit 2 shutdown on April 10, 2005 due to inoperable battery charger
- Unit 2 shutdown, manual reactor scram from 75% power on April 28, 2005, due to loss of “B” main transformer cooling
- Unit 2 shutdown, automatic reactor scram from 100% power on failure of the main generator voltage regulator

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 Samples)

a. Inspection Scope

The inspectors reviewed operability determinations that were selected based on risk insights, to assess the adequacy of the evaluations, the use and control of compensatory measures, and compliance with the Technical Specifications. In addition, the inspectors reviewed the selected operability determinations to verify whether the determinations were performed in accordance with NDAP-QA-0703, "Operability Assessments." The inspectors used the Technical Specifications, Technical Requirements Manual, FSAR and associated Design Basis Documents as references during these reviews. This inspection activity represented six samples. The issues reviewed included:

- Units 1 and 2 operability for General Electric (GE) Part 21 notification for potential to exceed safety limit, CR 662184
- Units 1 and 2 operability /extent of condition for “B” emergency diesel generator crankcase breaker bolt fell out of breaker, CR 669163
- Units 1 and 2 operability for high-pressure coolant injection (HPCI) condensate storage tank (CST) low level suction swap, OFR 668320
- Unit 1 operability/extent of condition for unit 125 volt battery chargers, CR 665179
- Unit 1 operability for “B” loop emergency service water (ESW) due to leak, CR 676926
- Unit 2 operability for ECCS instrumentation loops during TP-264-033, Steam Dryer Acoustic wave data collection.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 6 Samples)

a. Inspection Scope

The inspectors observed portions of post maintenance testing activities in the field to determine whether the tests were performed in accordance with the approved procedures. The inspectors assessed the test’s adequacy by comparing the test methodology to the scope of maintenance work performed. In addition, the inspectors evaluated the test acceptance criteria to verify whether the test demonstrated that the tested components satisfied the applicable design and licensing bases and the Technical Specification requirements. The inspectors reviewed the recorded test data to determine whether the acceptance criteria were satisfied. This inspection activity represented six samples. The post maintenance testing activities reviewed included:

- “D” battery charger retest following inspection and component replacement, PCWO 665208
- Suppression pool suction valve, HV15766, local leak-rate test (LLRT) following dynamic testing and packing adjustments, SE-159-097 and CR 66682
- Unit 2 control rod drive (CRD) pump suction filter following replacement, PCWO 660388
- “C” emergency diesel generator (EDG) testing following turbocharger replacement and engine overhaul, TP-024-147
- RHR Service Water pump (1P506A) and motor replacement, TP-116-011.
- Testing of safety parameter display system (SDPS) following multiplexer cable repair, ENS 41631, PCWO 643730

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20 - 3 Samples)

a. Inspection Scope

Non-Refueling Outages. The inspectors reviewed the outage risk management during the following three Unit 2 outages to confirm that PPL had appropriately considered risk:

April 10, 2005 “C” Battery charger Failure
April 28, 2005 Loss of “B” Main Transformer Cooling
June 6, 2005 Failure of the Main Generator Automatic Voltage Regulator

During the outages, the inspectors observed and / or reviewed the outage activities listed below.

- Initial plant shutdown
- Identification and resolution of problems
- Drywell walkdowns after shutdown and prior to final closeout (June 6, 2005)
- Plant restart reviews
- Reactor coolant system heat up

The inspectors reviewed the associated documentation to ensure that the tasks were performed safely and in accordance with plant Technical Specification requirements and operating procedures. This inspection activity represented three samples.

b. Findings

Introduction. The inspectors identified a self-revealing non-cited violation of Technical Specifications Section 5.4.1 “Administrative Controls - Procedures,” for not correctly implementing a surveillance on the 2D633 battery charger. This resulted in not identifying and correcting a degraded condition which contributed to the failure of the battery charger and subsequent Unit 2 shutdown on April 10, 2005.

Description. On March 3, 2005 station personnel completed the preventative maintenance to clean and inspect battery charger 2D633 (ERPM 490684). Step 6.4.1 of the maintenance procedure required the technicians to “remove panel covers and obstructions as necessary to facilitate the inspection and cleaning of the battery charger.” Step 6.4.4 required the technician to “check cables and connections for degradation, cracks and other signs of degradation.” These steps were completed with no identified deficiencies. On April 10, 2005 Unit 2 was operating at 100% power when the control room operators received 125 Volt DC battery alarms. PPL determined that battery charger 2D633 had failed. The charger was not charging the “C” 125 Volt DC battery and was not suppling the “C” 125 volt DC Subsystem. PPL entered Technical Specification 3.8.4, “DC Sources - Operating,” which allowed two hours to fix the battery charger or shutdown Unit 2. The battery charger was not restored to operation within two hours and Unit 2 was shut down.

PPL’s inspection of charger 2D633 identified that all three battery charger output fuses were blown and two leads and a jumper in the inductive-resistive-capacitive filter circuit had degraded insulation with some exposed wire. PPL’s root cause analysis concluded that the condition of the wires was the most likely cause of the charger failure. PPL concluded that the degraded wires were not identified in March 2005 when the biannual clean and inspection surveillance was performed. The degraded wires were in a location that was difficult to inspect without additional battery charger disassembly, which was not specified in the work package. Therefore, PPL did not correctly implement the work package to check all cables and connections for discoloration, cracks and other signs of degradation because the work was not properly pre-planned to allow complete inspection of these wires.

Prior to Unit 2 start up PPL inspected the other Unit 2 125 Volt DC battery chargers. Similar, but less severe, wire insulation degradation was found on two of the other three Unit 2 chargers.

Analysis. The inadequate implementation of the preventive maintenance is a performance deficiency which resulted in not identifying the degraded wires which contributed to the failure of the battery charger. Traditional enforcement is not required because the finding did not have actual safety consequence, did not have the potential for impacting the NRC’s ability to perform its regulatory function, and there were no willful aspects of the violation. This finding is greater than minor because the failure of battery charger 2D633 affected the Mitigating Systems cornerstone attributes associated with the operability, availability, reliability or function of a system or train in a mitigating system. The finding was evaluated in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," using Phase 1 and Phase 3 significance determination process (SDP). The Phase 1 screening determined that a Phase 2 evaluation was required, because the finding represented an actual loss of a safety function of a single train, for greater than its Technical Specification Allowed Outage Time. The Region 1 Senior Risk Analyst performed a Phase 3 evaluation instead of a Phase 2 evaluation because the Phase 3 evaluation was able to more accurately characterize the risk of this subsystem failure. Specifically, during the failure of the 2D633 battery charger, the “C” 125 Volt DC battery

was capable of suppling all required loads (4 hour mission) if an event would have occurred. However, the battery charger would not have been able to supply the 125 Volt DC loads or recharge the battery after the battery discharged. Therefore, a Phase 3 evaluation was used to characterize this failure. A fault exposure time of 14 hours was used for the 2D633 battery charger because the battery charger was out of service from 3:52 AM until 5:28 PM on April 10, 2005. A Phase 3 risk assessment determined this finding to be of very low safety significance (Green) because the delta core damage frequency for this finding was calculated to be 8.6E-9.

A contributing cause of this finding is related to the organizational performance category of the Human Performance cross-cutting area because the lack of adequate pre-planed work instructions resulted in maintenance personnel not inspecting all wires in the circuit as required by the work instructions. Therefore, the degraded wires were not identified and repaired in March 2005, and as a result battery charger 2D633 failed on April 10, 2005.

Enforcement. Technical Specification 5.4.1 a. requires that written procedures shall be established, implemented and maintained covering the activities in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, dated February 1978. Appendix A, Paragraph 9. a of this RG states "Maintenance that can effect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances." Contrary to the above, on March 03, 2005, station personnel performed a clean and inspection maintenance in accordance with ERPM 490684 on the 2D633 battery charger and no internal wire degradation was identified, partly due to lack of adequate pre-planned work instruction. On April 10, 2005, the 2D633 charger failed, in part, due to the condition of the wiring internal to the cabinet. Because this violation is of very low safety significance and PPL entered this finding in their corrective action program (CR 665179), this violation is being treated as a non-cited violation (NCV), consistent with section VI.A of the NRC Enforcement Policy **(NCV 05000388/2005003-001, "Inadequate Maintenance Performance Contributed to a Failure of 125 Volt DC Battery Charger 2D633).**

1R22 Surveillance Testing (71111.22 - 6 Samples)

a. Inspection Scope

The inspectors observed portions of selected surveillance test activities in the control room and in the field and reviewed the test data results. The inspectors compared the test result to the established acceptance criteria and the applicable Technical Specification or Technical Requirements Manual operability and surveillance requirements to evaluate whether the systems were capable of performing their intended safety functions. This inspection activity represented six samples. The observed or reviewed surveillance tests included:

- Units 1 and 2, SE-024-A01, "A" Emergency Diesel Generator (EDG) Integrated Surveillance Test (24 hour endurance run)

- Units 1 and 2, SE-070-011, 24 Month Secondary Containment Drawdown and Inleakage Test Zones I, II, III
- Units 1 and 2, SO-024-001, “A” Emergency Diesel Generator 4 Hour Surveillance Run
- Unit 1, SI-178-319B, Semi-Annual Calibration of Average Power Range Monitor Channel “A”
- Unit 1, SO-152-002 and SO-152-004, high-pressure coolant injection (HPCI) pump flow surveillance and valve inservice test (IST)
- Unit 2 SE-270-011, 24 Month Secondary Containment Drawdown and Inleakage Test Zones II and III

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modification (71111.23 - 3 Samples)

a. Inspection Scope

The inspectors reviewed temporary plant modifications to determine whether the temporary changes adversely affected system or support system availability, or adversely affected a function important to plant safety. The inspectors reviewed the associated system design bases, including the FSAR, Technical Specifications, and assessed the adequacy of the safety determination screenings and evaluations. The inspectors also assessed configuration control of the temporary changes by reviewing selected drawings and procedures to verify whether appropriate updates had been made. The inspectors compared the actual installations to the temporary modification documents to determine whether the implemented changes were consistent with the approved documents. The inspectors reviewed selected post installation test results to verify whether the actual impact of the temporary changes had been adequately demonstrated by the test. This inspection activity represented three samples. The following temporary modifications and documents were included in the review:

- Units 1 and 2 “D” emergency service water pump outside air damper wired open, PCWO 675650
- Unit 2, Connect temporary battery charger to 125 volt battery bank, TMOD 665186
- Unit 2, Radwaste gaseous treatment system guard beds with reduced charcoal quantity (pounds) and increased moisture content, TMOD 682803

b. Findings

Introduction. The NRC identified a Green non-cited violation of Technical Specification 5.4.1, “Administrative Controls - Procedures,” for not implementing station procedures, which resulted in the loss of seismic qualification of the “D” emergency service water ventilation subsystem.

Description. PPL did not correctly implement station procedures to secure the "D" emergency service water (ESW) pump ventilation damper in the open position on May 16, 2005. Incorrectly securing this damper resulted in the loss of seismic qualification of the "D" ESW ventilation subsystem. On June 7, 2005, when this loss of seismic qualification was discovered PPL declared the "D" ESW ventilation subsystem and "D" ESW pump inoperable until the damper was correctly secured in the open position restoring the seismic qualification of the damper.

On May 16, 2005, PPL identified that the pneumatic operator for the "D" ESW pump ventilation damper had failed with the damper in the closed condition. PPL entered Technical Requirement Manual (TRM), Section 3.7.6, "Engineering Safeguards Service Water (ESSW) Pumphouse Ventilation," action E to secure the affected damper in the open position. PPL operations issued clearance order (ZWO 675686) to disable the damper operator and secure the damper louvers in the open position. PPL maintenance secured the damper open under work order ERPM 597079. These work documents did not contain or provide any guidance on the proper method that must be used to secure the damper and there was no engineering evaluation requested for this work. Station personnel secured the damper by "wiring" it in the open condition.

Station procedure NDAP-QA-1218, "Plant Changes," Attachment B, item 5, "Gagging Dampers," requires an engineering evaluation be performed if the damper is secured without the use of an approved method to maintain the damper in an operable condition. In this event there was no procedural guidance or engineering guidance that allowed the damper to be secured using wire. On June 7, 2005, the inspectors questioned the seismic qualification of this damper and PPL determined that the damper did not meet the required seismic qualification. PPL declared the "D" ESW ventilation subsystem and the "D" ESW pump inoperable, in accordance with TRM Section 3.7.6. PPL performed an engineering evaluation (EWR 681288), in accordance with the guidance in NDAP-QA-1218, and approved the use of a special tool to secure and maintain the seismic qualification of the damper. PPL installed this tool and declared the damper operable on June 7, 2005.

Analysis. The finding is a performance deficiency because PPL did not implement station procedure NDAP-QA-1218, "Plant Changes," which required an engineering evaluation to provide guidance on the proper method to secure the ESW damper in the open position. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or PPL procedures. This finding is more than minor because the loss of seismic qualification affected the "Protection Against External Factors" Attribute of the of the Mitigating Systems cornerstone and the objective of ensuring the capability of a system (ESW) that responds to initiating events to prevent undesirable consequences. A SDP Phase 1 evaluation determined this finding to be of very low safety significance (Green) because the qualification deficiency did not result in the loss of function. Engineering Calculation EC-054-0532, and Safety Evaluation NL-99-057, determined that only two of the four fans in an ESSW Pumphouse division are needed to provide adequate cooling to ensure that both ESW pumps and both Residual Heat Removal Service Water pumps in that ESSW

Pumphouse division remain operational. During this event the other three fans were fully operable.

A contributing cause of this finding is related to the organizational performance category of the Human Performance cross-cutting area because operations and maintenance did not recognize the need to evaluate the modified damper configuration in accordance with NDAP-QA-1218, "Plant Changes."

Enforcement. TS 5.4.1 a, "Administrative Controls - Procedures," requires that written procedures shall be established, implemented and maintained covering the activities in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, dated February 1978. Appendix A, Paragraph 9. a of this RG states "Maintenance that can effect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances." PPL procedure NDAP-QA-1218, Attachment B, Item 5, "Gagging Dampers," guidance requires "If the damper is gagged without the use of an approved method or not in the fail safe position, then generate an engineering work request to Engineering to evaluate the need for a Temporary Modification or declare the effected system / component inoperable." Contrary to the above, PPL secured the "D" ESW ventilation damper in the open condition without the use of an approved method and did not generate an EWR for evaluation on May 16, 2005. Not using an approved method or properly pre-planning this work, as required by NDAP-QA-1218, resulted in reducing the seismic qualification of the damper. Because the inadequate implementation of NDAP-QA-1218 is of very low safety significance (Green) and has been entered into the PPL corrective action program (CR 681948), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy **(NCV 05000387, 388/2005003-002, "Inadequate Evaluation for a Degraded Emergency Service Water Ventilation Damper")**.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 - 1 Sample)

a. Inspection Scope

During the period of April 1 - June 23, 2005, the NRC has received and acknowledged the changes made to Susquehanna's E-Plan in accordance with 10 CFR 50.54(q), which PPL had determined resulted in no decrease in effectiveness to the Plan and which have concluded to continue to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR 50. The inspector conducted a sampling review of the Plan changes which could potentially result in a decrease in effectiveness. This review does not constitute an approval of the changes and, as such, the changes are subject to future NRC inspection. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, and the applicable requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 4 Samples)

a. Inspection Scope

The inspector reviewed radiation work permits (RWPs) for airborne radioactivity areas with the potential for individual worker internal exposures of >50 mrem committed effective dose equivalent (CEDE), and verified barrier integrity and engineering controls performance. The inspector examined PPL's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools. The inspector discussed with the Radiation Protection Manager (RPM) high dose rate - high radiation area and very high radiation area (VHRA) controls and procedures, and verified that any changes to PPL procedures did not substantially reduce the effectiveness and level of worker protection. The inspector discussed with first-line HP supervisors the controls in place for special areas that have the potential to become VHRA during certain plant operations, and determined that these plant operations require communication beforehand with the HP group, so as to allow corresponding timely actions to properly post and control the radiation hazards.

The inspector conducted direct observations of PPL activities in the drywell during a forced shutdown at Unit 2 which commenced on June 6, 2005. These inspection activities represented 4 samples. The documents reviewed are provided in the Attachment.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02 - 3 Samples)

a. Inspection Scope

The inspector obtained a list of work activities from PPL ranked by actual/estimated exposure that have been completed during the last outage and select the 3 work activities of the highest exposure significance. The inspector compared the results achieved (dose rate reductions, person-rem used) with the intended dose established in PPL's ALARA planning for these work activities (RHR F050 valves, in-service inspection, and control rod drive exchange).

The inspector conducted direct observations of PPL activities in the drywell during a forced shutdown at Unit 2 which commenced on June 6, 2005. This inspection activity represented three samples. The documents reviewed are provided in the Attachment.

Enclosure

b. Findings

Introduction. The inspectors identified a green self-revealing finding having very low safety significance due to a deficiency in maintaining radiation dose as low as reasonably achievable (ALARA). During the Susquehanna Unit 2 refueling outage (2RI012), rework on the RHR shutdown cooling vessel return valves F050A and F050B resulted in a collective exposure of 17.006 person-rem against a goal of 6.830 person-rem. This additional collective exposure was principally the result of problems associated with the seat lapping tool and an inability to effectively hydrolaze the work area piping.

Description. During the Unit 2 RI012, the RHR F050A and F050B valves failed local leak rate testing. Work to repair these two valves exceeded the exposure estimate by 149%. PPL has identified in its ALARA post job review (# 20052343) items which led to this additional collective exposure involving: an ineffective lapping tool and a cocked pressure seal on the F050A valve, resulting in repetitive reworking of the valve seat; failure to practice shielding installation of the F050B valve in a mock-up; lack of remote monitoring during initial work on the F050A valve; lack of pre-outage planning for stellite seat replacement; parts issues involving as delivered condition and wrong parts; and, an inability to effectively hydrolaze the work area to reduce exposure rates. These problems resulted in higher than anticipated work area dose rates, and especially in a significant increase in the number of hours worked to complete the task (565 person-hours estimated, 1147 person-hours actual).

Analysis. The occupational radiation safety significance determination defines a performance deficiency as one in which the licensee fails to meet a standard and the cause was reasonably within the licensee's ability to foresee or correct. Exposure rates could have been reduced if effective hydrolazing had been implemented, and the amount of rework reduced if effective tooling had been utilized. Accordingly, the significant amount of additional exposure required to complete the activity is predominantly the result of inadequate planning and preparation, i.e., activities that were well within PPL's ability to control.

Traditional enforcement is not required because the finding did not have actual safety consequences, did not have the potential for impacting the NRC's ability to perform its regulatory function, and there were no willful aspects of the finding. The finding is greater than minor in that it is associated with the ALARA planning attribute of the radiation safety cornerstone, and affects the objective of providing adequate protection of the worker from exposure to radiation. The finding involves a failure to implement, to the extent practical, procedures or engineering controls, needed to achieve occupational doses that are ALARA, and that resulted in unplanned occupational collective dose. The inspector used IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," to characterize the risk significance of this finding. Based upon Susquehanna's three-year-rolling-average (2002-2004) being below the SDP criteria of 240 person-rem for boiling water reactors, therefore, this finding is of very low safety significance.

The inspectors identified that a contributing cause of this finding was related to the organizational performance category of the Human Performance cross-cutting area because health physics and maintenance personnel did not adequately prepare for the work to be performed, and did not review the documentation and lessons learned of similar work performed in earlier outages.

Enforcement. The ALARA rule contained in 10 CFR 20.1101(b) Statements of Consideration indicates that compliance with the ALARA requirement will be judged on whether the licensee has incorporated measures to track and, if necessary, to reduce exposures and not whether exposures and doses represent an absolute minimum or whether the licensee has used all possible methods to reduce exposures. The overall exposure performance of the nuclear power plant is used to determine compliance with the ALARA rule. Since this issue is an isolated occurrence and the remainder of the work performed during the Susquehanna refueling outage (Unit 2 RIO12) was in compliance with the ALARA rule, no violation of 10CFR20.1102(b) has occurred.

2OS3 Radiation Monitoring Instrumentation (71121.03 - 1 Sample)

a. Inspection Scope

The inspector conducted a review of selected radiation protection instruments located in the radiologically controlled area (RCA). Items reviewed were: verification of proper function; certification of appropriate source checks; and calibration for those instruments used to ensure that occupational exposures were maintained in accordance with 10 CFR 20.1201. This inspection activity represented one sample. The documents reviewed are provided in the Attachment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 - 1 Sample)

b. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators (PIs) listed below for the period from March 2004 through March 2005 To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, “Regulatory Assessment Indicator Guideline,” Rev. 1, were used to verify the basis in reporting for each data element.

Occupational Radiation Safety Cornerstone

- Occupational Exposure Control Effectiveness PI

Licensee records reviewed included those used by the licensee to identify occurrences of locked high-radiation areas, very high-radiation areas, and unplanned personnel exposures. Additional records reviewed included ALARA records addressing individual exposures. The inspectors also interviewed licensee personnel that were accountable for collecting and evaluating the PI data.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 1 Annual Sample, 1 Semi-Annual Sample)

1. Annual Sample Review

a. Inspection Scope

Following the loss of "B" Unit 2 Main Transformer cooling and the subsequent manual reactor scram on April 28th, inspectors reviewed the operator actions that were unsuccessful in restoring transformer cooling and discussed with plant operators what actions could be performed to avoid a reactor scram for this equipment failure. Inspectors reviewed PPL's corrective action items issued in prior years in response to industry operating experience on electrical transformer single failure vulnerabilities. Inspectors reviewed the previous events and problems with Unit 2 transformer cooling including a loss of all cooling to the "A" transformer in 2003 and the corrective actions initiated to prevent recurrence. The documents reviewed are listed in the Attachment.

b. Findings and Observations

Introduction. Inspectors identified that PPL did not follow the corrective action program procedure NDAP-QA-702, following the loss of all cooling to the Unit 2 "A" main transformer at Susquehanna Unit 2 on March 27, 2003. This event identified that the l loss of transformer cooling could result in a plant transient (reactor scram). Contrary to the corrective action procedure, PPL initiated no actions to prevent recurrence or mitigate its effects until after another loss of main transformer cooling which caused a reactor scram two years later on April 28th 2005.

Description. Susquehanna Unit 2 has three single phase main transformers that supply power to the 500 KV switchyard for grid distribution. Transformer cooling is accomplished by a system of oil pumps that circulate oil through a series of fins with mounted fans that circulate air to remove the heat from the oil. There are two banks of cooling per transformer and each bank consists of 12 fans and 2 oil pumps for a total of 24 fans and 4 oil pumps per transformer. The transformer cooling system has a normal and an alternate power supply that feeds both banks and a normal seeking automatic transfer logic that will automatically transfer cooling bank power to the alternate supply if the normal supply is lost.

Following transformer replacement modifications, and a review of industry operating experience in 2002, PPL identified that the automatic transfer scheme of the power supplies to the Unit 2 main transformer cooling pump and fan configuration contained single-point failure vulnerabilities. PPL discovered that when one of the 72 fans or 12 pumps in the cooling system banks has a ground fault (or similar failure) it has the potential to trip the normal 480v power supply and then ten seconds later the automatic transfer scheme switches to alternate 480v power. This action re-energizes the failed component and trips the alternate 480 power supply. The loss of both normal and alternate 480 volt power results in a complete loss of forced cooling for the transformer. The alarm response procedure directed the operator to scram the reactor if power is greater than 25 % and a main transformer is without cooling for greater than ten minutes.

A loss of all cooling to the Unit 2 'A' main transformer at Susquehanna Unit 2 on March 27, 2003 identified that total loss of transformer cooling could result in a reactor scram. Operators questioned the appropriateness of the manual reactor scram after ten minutes as documented in the initial operability evaluation for this equipment failure. The Corrective Action Review Board (CARB) discussed the issue of the operator action to scram the plant. The conclusion was that the operator initiated scram was not the most appropriate initial response for a loss of cooling event and CARB recommended actions to evaluate operating procedures. Inspectors identified this as a key opportunity to change plant procedures to substantially reduce or eliminate the need of a manual reactor scram on a loss of main transformer cooling. The PPL Corrective Action procedure NDAP-QA-702, requires the implementation of interim corrective actions to prevent recurrence, minimize the problem or mitigate its effects. Contrary to this procedure requirement and the CARB recommendations, PPL did not initiate actions to prevent recurrence or mitigate its effects until after another loss of Main Transformer Cooling. When a loss of main transformer cooling occurred on April 28th 2005, the operators did not have any workable procedure to isolate banks and restore power to recover transformer oil cooling within 10 minutes. Procedures still contained the action to scram the reactor after 10 minutes if no cooling existed when above 25% power. The lack of corrective actions to station procedures was a primary cause of a reactor scram.

Analysis. This finding is a performance deficiency because PPL did not follow the corrective action procedure, NDAP-QA-702, to implement actions to reduce risk or mitigate the effects of the issue. Inspectors concluded that the failure to follow the PPL corrective action process procedure directly contributed to the reactor scram event on April 28. Traditional enforcement is not required because the finding did not have actual safety consequences, did not have the potential for impacting the NRC's ability to perform its regulatory function, and there were no willful aspects of the finding. This finding is greater than minor because it is associated with the design control and procedure adequacy performance attributes of the Initiating Events cornerstone and the finding negatively effected the cornerstone objective to limit the likelihood of those events that upset plant stability. The finding was determined to be of very low significance (Green) since as a transient initiator it did not contribute to the likelihood of mitigation equipment or functions not being available.

This finding is related to the corrective action category of the Problem Identification and Resolution cross-cutting area because PPL did not take action on identified problems in accordance with corrective action and work process procedures to implement actions that could prevent recurrence, minimize the problem or mitigate its effects.

Enforcement. Since the main generator output transformers are not safety-related, there were no violations of NRC requirements. Although the main electrical generator transformers are not safety related components, the reliability of these components does impact the initiating events safety cornerstone. The inspectors determined that PPL had opportunity following the equipment failure on March 27, 2003 to remove the design vulnerability or complete actions to provide adequate procedure guidance and operator training to promptly combat a loss of transformer cooling and thus prevent a reactor scram. The NRC concluded that the failure to follow the PPL corrective action process procedure NDAP-QA-702, directly contributed to the reactor scram event of April 28.

2. Semi-Annual PI&R Trend Review

a. Inspection Scope

The inspectors reviewed PPL's initial evaluation and associated corrective actions for condition reports (CR's) related to loose fasteners and torquing issues on plant systems from date 2001 to May 2005. This sample was selected due to the potential for an adverse trend with regard to resolving potentially repetitive bolting/fastener issues. The review evaluated PPL's threshold for identifying and resolving problems. The documents reviewed are in the Attachment.

c. Findings

No findings of significance were identified.

d. Observations

The inspectors identified a high rate of system bolting/fasteners issues. Inspectors observed that PPL's problem resolution or completed actions were narrowly focused for bolting and fastener issues. This is illustrated by the fact that although there had been four Level 1 Root Cause Analysis CR's generated for bolting issues in the last two years as well as several NRC non-cited violations and documented observations on loose EDG fasteners, PPL continues to have fastener and bolting issues on risk significant equipment. Inspectors found that the number of deficient mechanical fasteners discovered on station equipment over the last two years is a negative human performance trend.

Inspectors observed that in the second quarter of 2005 PPL has expanded the scope or broadness of corrective actions taken and also those planned to reverse or stop this negative trend. The actions taken to address the bolting issues trend include: just in time training for all mechanics to review the requirements of torquing, a revision to the maintenance torquing procedure, MT-GM-015, checking the torque of all accessible

fasteners during the last 'C' EDG overhaul and the development of a continuing training program to cover torquing and thread engagement issues. PPL also has actions planned to identify applicable training for Electrical and I&C and plans to dedicate mechanics to torque all diesel bolting not otherwise covered in the next 'A' EDG maintenance overhaul.

4OA4 Cross Cutting Aspects of Findings

Cross Reference to Human Performance Findings Documented Elsewhere

Section 1R23 describes an NCV where PPL's operations and maintenance work groups did not recognize the need to have engineering evaluate the method that was used to secure the damper in accordance with NDAP-QA-1218, "Plant Changes. This resulted in a loss of seismic qualification on the "D" emergency service water ventilation subsystem. Ths finding was related to the organizational performance category of the Human Performance cross-cutting area.

Section 1R20 describes an NCV where inadequately pre-planed work instructions resulted in maintenance individuals not inspecting all wires in the 2D633 Battery Charger as required by the work instructions. This resulted in the failure of battery charger 2D633 and subsequent Unit 2 shutdown on April 10, 2005. This finding was related to the organizational performance category of the Human Performance cross-cutting area.

Section 2OS2 describes a finding where health physics and maintenance personnel did not adequately prepare for the work to be performed, and did not review the documentation and lessons learned of similar work performed in earlier outages. This finding was related to the organizational performance category of the Human Performance cross-cutting area.

4OA5 Other Activities

1. TI 2515/163, Operational Readiness of Offsite Power

Cornerstones: Initiating Events, Mitigating Systems

a. Inspection Scope

The inspectors performed Temporary Instruction 2515/163, "Operational Readiness of Offsite Power." The inspector collected and reviewed licensee procedures and supporting information pertaining to the offsite power system specifically relating to the areas of offsite power operability, the maintenance rule (10 CFR 50.65), and the station blackout rule (10 CFR 50.63). The inspector reviewed this data against the requirements of 10 CFR 50.63; 10 CFR 50.65; 10 CFR 50 Appendix A General Design Criterion 17, Electric Power Systems; and Plant Technical Specifications. This information was forwarded to NRR for further review.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On July 14, 2005, the resident inspectors presented the inspection results to Mr. Britt McKinney and other members of his staff, who acknowledged the findings. No proprietary information is contained in this report and the inspectors did not retain any proprietary documents.

4OA7 Licensee-identified Violations

PPL identified the following violation of very low safety significance (Green). This is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a Non-Cited Violation.

- 10 CFR 50 Appendix B, Criterion III requires measures to assure that applicable regulatory requirements and the design basis as defined in 50.2 and as specified in the license application are correctly translated into the specifications, drawings procedures and instructions. Design control measures shall provide for the verifying or the checking of the adequacy of design. Contrary to these requirements PPL identified that the design calculation providing the allowable setpoint value for Condensate Storage Tank (CST) low level did not adequately address the possibility of vortex formation in the suction line during the HPCI suction transfer process. PPL determined the Technical Specification allowable value of greater than 36 inches to be non-conservative given the current valve transfer logic and valve stroke times. Although administrative controls and additional dynamic analysis demonstrates that HPCI and RCIC are operable, the non-conservative Technical Specification is a condition adverse to quality as described by NRC Administrative Letter 98-10. PPL has taken compensatory measures to maintain operability of the suction swap-over function until the condition can be permanently corrected. PPL has entered this issue into the corrective action program as CR 667984. This finding is of very low safety significance because although the design deficiency substantially reduced design margin there was no loss of HPCI or RCIC functions.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

Section 1R07: Biennial Heat Sink Performance

W. Basta, Senior Chemist
R. Centenaro, Senior Engineer, Nuclear Design
J. Jeanguenot, ESW System Engineer
D. Leimbach, Eddy Current Level III, Inservice Inspection
E. Miller, Senior Engineer, Nuclear Regulatory Affairs
R. Stanley, Senior Engineer, Component Engineering
J. Wolfer, Senior Chemist

Section 2OS: Occupational Radiation Safety

J. Fritzen, Radiological Support Supervisor
J. Jessick, Health Physics Foreman
R. Kessler, Health Physicist - ALARA
V. Schuman, Radiological Protection Manager
E. Wolf, Radiological Operations Supervisor

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000387/2005003-001 and 05000388/2005003-001	NCV	Inadequate Maintenance Performance Contributed to a Failure of 125 Volt DC Battery Charger 2D633
05000387/2005003-002 and 05000388/2005003-002	NCV	Inadequate Evaluation for a Degraded Emergency Service Water Ventilation Damper

LIST OF BASELINE INSPECTIONS PERFORMED

Sections 2OS: Occupational Radiation Safety

7112101	Access Control	2OS1
7112102	ALARA Planning and Controls	2OS2
7112103	Radiation Monitoring Instrumentation	2OS3

LIST OF DOCUMENTS REVIEWED
(Not Referenced in the Report)

Section 1R04

Unit 1, 134A-Sone I HVAC Supply System Health Report
Unit 2, 234A-Zone II HVAC Supply System Health Report

FSAR Analysis:

Section 1.2.1.2.2.2 Containment and Isolation Criteria
Section 1.2.2.4.8 Secondary Containment
Section 3.1.2.2.7 Containment Design (Criterion 16)
Section 3.1.2.4.12 Containment Atmosphere Cleanup (Criterion 41)
Section 3.8.4.1 Description of the Structures
Section 6.0 Engineered Safety Features
Section 6.2.3 Secondary Containment Functional Design

Documents:

CR 666835, CR 653392, CR 581338, CR 677639, CR 614258, CR 621353, CR620539, CR 615944, WO 617320,

Section 1R07: **Biennial Heat Sink Performance**

Condition and Action Reports:

067834, 249568, 266792, 271146, 382330, 447541, 449938, 453753, 508937, 579708, 590401, 603759

Inspections and Evaluations:

Eddy Current Testing Final Report, SSES 2E1232B, dated September 2002
Eddy Current Testing Final Report, SSES OS117A, December 2002
Eddy Current Testing Final Report, SSES 1E202C, April 2003
Work Order (WO) 337948, TBCCW HX Cleaning and Inspection, September 26, 2001
SO-054-A03, Quarterly ESW flow verification - Loop A, Feb. 23, 2005 and Nov. 24, 2004
SO-054-B03, Quarterly ESW flow verification - Loop B, Feb. 16, 2005 and Nov. 17, 2004
TP-054-076, ESW flow balance, Sept. 24, 2004

Procedures:

Chemistry matrix Ch-042-001 (Service/Circ water), Rev. 33, Feb. 15, 2005
Chemistry matrix Ch-054-001 (ESW), Rev. 16, Nov. 20, 2003
H-1001, Heat exchanger tube cleaning, Rev. 5
H-1004, Heat exchanger inspection and condition assessment, Rev. 6

NDAP-QA-0504, Heat Exchanger Program, Rev 4
MT-GM-025, Heat Exchanger Cleaning and Inspection, Rev 13
TP-149-079, RHR Heat Exchanger Performance Test, Rev 1
MT-049-004, RHR Pump Motor Cooler Chemistry Flush, Rev 2
M1453, Heat Exchanger Tube Plugging, Revision 5

Design Information:

Design Basis Document (DBD) - 009, ESW and RHR Service Water System, Revision 1
Design Basis Document (DBD) - 048, Turbine Building Closed Cooling Water (TBCCW) System, Revision 1
Calc EC-015-0502, Establish Design Flow and Heat Load for TBCCW System and the TBCCW Heat Exchanger Tube Plugging Limit, Revision 2
Calc EC-049-0518, RHR Pump Motor Oil Cooler Pressure, Revision 1
Calc EC-054-0516, Scale Buildup on ESW Pipe to RHR Motor Oil Coolers, Revision 0
Calc EC-054-0560, Determine Minimum ESW Flow Required to TBCCW Heat Exchanger for ESW Flow Balance, Revision 0
Drawing No. M—111, Emergency Service Water System, Sheet 2, Revision 43
Drawing No. M—2109, Service Water System, Sheet 2, Revision 11

Miscellaneous Documents

Regulatory Guide 1.27, Ultimate Heat Sink for Nuclear Power Plants, dated January 1976
Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment, dated July 1989
PPL responses to GL 89-13, dated Feb. 23, 1990, through Feb. 12, 1997, et al

Section 1EP4: Emergency Action Level (EAL) and Emergency Plan (E-Plan Changes

Susquehanna Emergency Response Plan and Implementing Procedures

Sections 2OS: Occupational Radiation Safety

Condition Reports:

677854, 677526, 670746, 673128, 672300, 668205, 661802, 661639, 660942, 655192, 659165, 659725, 660377, 663437, 665782, 673415, 651229, 658710, 659029, 654401, 659447, 659723, 662481, 662564, 663839, 666291, 660043, 660075, 660408, 660144, 660099, 660116, 660128, 660137, 660162, 660170, 681298

ALARA Post Job Reviews:

20052360, 20052352, 20052351, 20052353, 20052370, 20052372, 20052343, 20052103, 20052380, 20052406

Section 4OA2: **Identification and Resolution of Problems**

Condition Reports and CR Action Items:

423838, 452262, 448071, 488071, 670326, 670343, CRA 424597, CRA 445133

Procedures:

NDAP-QA-0702, Corrective Action
NDAP-00-0752 Root Cause Analysis
NDAP-QA-0524 Equipment Reliability and Health Process
AR-206-001, Main Transformer Trouble Alarm
PCAF 2001-3662, Changes to Alarm response procedures for U-2 Main Transformer

LIST OF ACRONYMS

ALARA	As Low As Is Reasonably Achievable
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CR	Condition Report
CST	Condensate Storage Tank
EAL	Emergency Action Level
EP	Emergency Preparedness
ESW	Emergency Service Water
FSAR	[SSES] Final Safety Analysis Report
GL	Generic Letter
HP	Health Physics
HPCI	High-Pressure Coolant Injection
HVAC	Heating, Ventilation and Air-Conditioning
IMC	Inspection Manual Chapter
KV	Kilovolts
MPFF	Maintenance Preventable Functional Failure
NCV	Non-cited Violation
NDAP	Nuclear Department Administrative Procedure
NRC	Nuclear Regulatory Commission
PI	[NRC] Performance Indicator
PI&R	Problem Identification and Resolution
PPL	PPL Susquehanna, LLC
RCA	Radiologically Controlled Area
RCIC	Reactor Core Isolation Cooling
RG	[NRC] Regulatory Guide
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RPM	Radiation Protection Manager
RPS	Remote Shutdown Panel
RR	Reactor Recirculation
RSPS	Risk Significant Planning Standard
RWCU	Reactor Water Cleanup
RWP	Radiation Work Permit
SDP	Significant Determination Process
SDPS	Safety Parameter Display System

SRV	Safety Relief Valve
SSES	Susquehanna Steam Electric Station
TMOD	Temporary Modification
TRM	Technical Requirement Manual
VHRA	Very High Radiation Area
WO	Work Order
ZWO	Administrative Work Order (Clearance Order)