January 24, 2003

Mr. Bryce L. Shriver
Senior Vice President and
Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC INTEGRATED INSPECTION REPORT 50-387/02-06, 50-388/02-06

Dear Mr. Shriver:

On December 28, 2002, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed report documents the inspection findings which were discussed on January 7, 2003, with Mr. R. Anderson, Vice President - Nuclear Operations, and other members of your staff.

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 documents four NRC identified findings of very low safety significance (Green) that were determined to involve violations of NRC requirements. However, because of the very low safety significance and because the issues were entered into your corrective action program, the NRC is treating these four findings as Non-cited Violations (NCVs), in accordance with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV 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.

Since the terrorist attacks on September 11, 2001, the USNRC has issued two Orders (dated February 25, 2002, and January 7, 2003) and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance access authorization. The USNRC also issued Temporary Instruction 2515/148 on August 28, 2002, that provided guidance to inspectors to audit and inspect licensee implementation of the interim compensatory measures (ICMs) required by the February 25th Order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during calendar year (CY) '02, and the remaining inspections are scheduled for completion in CY '03. Additionally, table-top security drills were conducted at several licensees to evaluate the impact of expanded adversary characteristics and the ICMs on licensee protection and mitigative strategies. Information gained and discrepancies identified during the audits and drills were reviewed and dispositioned by the

Office of Nuclear Security and Incident Response. For CY '03, the USNRC will continue to monitor overall safeguards and security controls, conduct inspections, and resume force-on-force exercises at selected power plants. Should threat conditions change, the USNRC may issue additional Orders, advisories, and temporary instructions to ensure adequate safety is being maintained at all commercial power reactors.

In accordance with 10CFR2.790 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).

If you have any questions please contact me at 610-337-5209.

Sincerely,

/RA/

Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 50-387/02-06, 50-388/02-06
with Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 05000387, 05000388

License Nos.: NPF-14, NPF-22

Report No.: 50-387/2002-06, 50-388/2002-06

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station

Location: 769 Salem Boulevard
Berwick, PA 18603

Dates: September 29, 2002 to December 28, 2002

Inspectors: S. Hansell, Senior Resident Inspector
J. Richmond, Resident Inspector
J. Noggle, Senior Health Physicist
N. McNamara, Emergency Preparedness Inspector

Approved by: Mohamed M. Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000387/2002-006, 05000388/2002-006; PPL Susquehanna, LLC; 09/29/2002 - 12/28/2002; Susquehanna Steam Electric Station, Units 1 and 2. Maintenance Effectiveness, Risk Assessment, and Personnel Performance During Non-routine Plant Evolutions.

The report covered a 13 week period of inspection by resident inspectors, a senior health physicist, and an emergency preparedness inspector. Four Green non-cited violations (NCV's) were identified. The significance of most findings is 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 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. Inspection Findings

Cornerstone: Mitigating Systems

- **Green.** The inspectors identified a non-cited violation of 10 CFR 50.65 (a)(2), the Maintenance Rule, because PPL did not demonstrate the effectiveness of preventative maintenance for the emergency lighting systems and did not place the systems in a 50.65(a)(1) category and monitor against established goals. As a result, a progressive degradation of the 125 VDC emergency lighting systems occurred that caused the lighting systems to not be capable of performing their intended function.

  This finding was more than minor because PPL's maintenance rule 10 CFR 50.65 (a)(2) demonstration became invalid when the lighting system degradation resulted in a loss of the system's function. This finding was only of very low safety significance because the finding did not contribute to a loss of mitigation equipment functions, and did not increase the likelihood of a fire or flooding event. In addition, during the period that the emergency lights were unavailable, there was no actual loss of normal lighting.

  A contributing cause of this finding was related to the Problem Identification and Resolution cross-cutting area. Plant personnel did not identify and report numerous emergency lights which had burnt out. The lack of problem identification contributed to the systems' progressive degradation. The causal relationship between this finding and the cross-cutting area was that plant personnel did not identify that numerous emergency lights were not functional and, as a result, the systems degraded to a point where they could not perform their intended functions. (Section 1R12.2)

- **Green.** The inspectors identified a non-cited violation of Technical Specification 5.4.1, with two examples, because PPL did not implement their written procedures for the fire protection program and the control of plant equipment. The removal of the Unit 1 emergency lighting system was not adequately communicated to the control room (failure to control plant equipment). As a result, during replacement of the Unit 1 emergency lighting system 125 VDC battery, PPL did not perform required compensatory actions to provide portable sealed beam hand lights throughout the plant.

This finding was more than minor because it affected the mitigating systems cornerstone objective. A lack of emergency lights had a direct relationship to the cornerstone's objective because the performance deficiency affected the cornerstone's human performance attribute, in that post-event human errors could reasonably increase. This finding was only of very low safety significance because it did not represent an actual loss of a safety function for Technical Specification equipment, or an actual loss of non-Technical Specification equipment designated as risk significant. In addition, during the period that the emergency lights were unavailable, there was no actual loss of normal lighting.

A contributing cause of this finding was related to the Human Performance cross-cutting area. The causal relationship between this finding and the cross-cutting area was that plant operators did not follow procedures to monitor system status and control plant equipment, and, as a result, did not perform required compensatory actions. (Section 1R13.2)

Cornerstone: Emergency Preparedness

- **Green.** The inspectors identified a non-cited violation of 10 CFR 50.54(q), "Conditions of Licenses for Emergency Plans," because PPL did not follow their written procedures for their Emergency Plan, Section 5.1, "Classification System." As a result, PPL did not obtain sufficient information, available from security and other plant personnel, related to a transformer failure (explosion and fire), to adequately evaluate plant conditions against the appropriate Emergency Plan classification criteria.

  This finding was more than minor because it affected the Emergency Preparedness cornerstone objective, to ensure that PPL is capable of implementing adequate measures to protect public health and safety in response to an actual event. The inadequate assessment of all available plant information could lead to an incorrect or missed event classification. In addition, it could result in delayed activation of the on-shift emergency response organization and delayed notification to off-site agencies. This finding was only of very low safety significance, and was not greater than very low safety significance, because the performance issue occurred during an actual Unusual Event and did not occur during an event of a higher emergency classification. (Section 1R14.2)

- **Green.** The inspectors identified a non-cited violation of 10 CFR 50.54(q), "Conditions of Licenses for Emergency Plans," because PPL did not follow their written procedures for their Emergency Plan, Section 6.0, "Organizational Control of Emergencies." As a result, during a declared Unusual Event, PPL used an individual who was not pre-assigned or trained, per procedure, to perform the control room communicator function. This contributed to PPL's inadequate communication to the NRC on the cause of the event classification.

  This finding was more than minor because it affected the Emergency Preparedness cornerstone objective, to ensure that PPL is capable of implementing adequate

measures to protect public health and safety in response to an actual event. Contrary to plant procedures, PPL did not use a trained person to perform the control room communicator function during an actual event. This performance deficiency had a direct relationship to the cornerstone's emergency response organization performance attribute, in that the untrained individual provided the wrong reason for the event classification to an off-site agency. This finding was only of very low safety significance, and was not greater than very low safety significance, because the performance issue occurred during an actual Unusual Event and did not occur during an event of a higher emergency classification.

A contributing cause of this finding was related to the Human Performance cross-cutting area. The causal relationship between this finding and the cross-cutting area was that plant operators did not follow procedures to use a trained individual as the control room communicator. (Section 1R14.3)

B. Licensee Identified Violations

None.

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Report Details

Summary of Plant Status

Susquehanna Steam Electric Station (SSES) Unit 1 began the inspection period at full power. On October 10, PPL commenced a unit shutdown, required by plant Technical Specifications, due to an inoperable off-site power source (see Section 1R14.2 and 4OA5.2). The shutdown was halted at 30% reactor power, when the off-site power source was returned to service. The unit was returned to full power on October 11, and operated at or near full power during the remainder of the inspection period.

Unit 2 began the inspection period at full power. On September 30, an automatic reactor shutdown occurred due to a main turbine trip (see Section 1R14.1). A unit startup was commenced on October 2. On October 3, at approximately 2% reactor power, the unit was manually shutdown due to a failure of T-20 (see Section 1R14.2). A unit startup was commenced on October 12, and reached full power on October 15. The unit operated at or near full power during the remainder of the inspection period.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness

1R01 Adverse Weather (71111.01)

a. Inspection Scope

The inspectors reviewed PPL's preparations for cold weather conditions and performed plant walkdowns for selected structures, systems, and components. The walkdowns and reviews were conducted to determine the adequacy of PPL's weather protection activities and system features. The inspectors compared their observations to PPL's procedures for cold weather protection of the associated systems. The areas, components, and documents included:

Structures, Systems, and Components

- Emergency Service Water Pumphouse and Fire Pump Area, on October 30
- Station Blackout emergency diesel generator, on December 16

Procedures and Documents

- NDAP-00-0024, "Winter Operation Preparations and Severe Weather Operation"
- SO-100-006, Attachment A, "Shiftly Surveillance Logs"
- OP-185-001, "Freeze Protection System"
- Condition Report AR-438560

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments (71111.04Q)

.1 Partial System Walkdowns

a. Inspection Scope

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. The walkdowns included the following systems:

- Unit 1 startup transformer T-10 walkdowns, during replacement of Unit 2 startup transformer T-20, walkdowns performed as part of Notice of Enforcement Discretion follow-up actions, on October 5, 6, and 7
- Unit Common fire protection system water supply, with pumps aligned to Unit 1 and 2 cooling towers while the normal supply (clarified water storage tank) was out of service, on October 30
- Units 1 and 2 high pressure coolant injection (HPCI) systems, during T-20 outage while both Unit 1 and Unit 2 reactor core isolation cooling (RCIC) systems were out of service, on October 31

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Routine Plant Area Inspections (71111.05Q)

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. The areas and documents reviewed included:

Plant Areas and Fire Zones

- Unit 1 startup transformer T-10, during Unit 2 startup transformer T-20 replacement, Fire Zone 0-00, on October 3-8
- Unit 2 startup transformer T-20, during fire protection system functional test, after modifications to the T-20 fire deluge system, Fire Zone 0-00, on October 9
- Unit 2 reactor feedwater pump turbine rooms, Fire Zone 2-32I, Turbine Building (TB) elevation 670, prior to Unit startup
- Unit 2 HPCI, Fire Zone 2-1C, Reactor Building (RB) elevation 645, with system in standby
- Units 1 and 2 turbine building closed cooling water (TBCCW) pump and heat exchanger area, during system modification and welding activities, Fire Zone 0-21A, TB elevation 656, on December 17
- Unit 1 battery rooms and DC distribution panel areas, Fire Zones 0-28I,J,K,L,M, and N, Control Structure (CS) elevation 771, on December 19
- Units 2 battery rooms and DC distribution panel areas, Fire Zones 0-28A,C,D,E, F, G, and T, CS elevation 771, on December 19
- Units 1 and 2 turbine building roofs, in the area of the main turbine lube oil vapor mist eliminator exhausts, following identification that excessive oil mist was saturating small portions of the turbine building roofs, on December 23

Pre-fire Plans Procedures and Documents

- FP-013-133, "Common Equipment Room, TB Elevation 656"
- FP-213-278, "RFP Turbine A, B, C Rooms, TB Elevation 670"
- FP-213-238, "Unit 2 HPCI Pump Room, RB elevation 645"
- FP-013-168 and 169, "Unit 1 Equipment and Battery Rooms, CS Elevation 771"
- FP-013-170 and 171, "Unit 2 Equipment and Battery Rooms, CS Elevation 771"
- FP-013-370, "Transformer Yard Area"
- NDAP-QA-0441, "Fire Protection System Station Control"
- NDAP-QA-0449, "Fire Protection System Program"

b. Findings

No findings of significance were identified.

.2 Station Fire Brigade Performance (71111.05A)

a. Inspection Scope

On December 16, the inspectors observed an announced fire brigade drill in the radiological control area. The fire was a simulated metal fire in the maintenance repair shop. The inspectors assessed PPL's strategies to fight a fire on-site and to evaluate the readiness of PPL to prevent and fight fires.

The inspectors observed the fire brigade members don protective clothing and turnout gear. In addition, the inspectors observed the fire fighting equipment brought to the fire area scene to evaluate whether sufficient equipment was available for the simulated fire. The inspectors observed fire fighting directions and radio communications between the

brigade leader, brigade members, and the control room. The inspectors reviewed the post drill critique to evaluate if the drill objectives' acceptance criteria were satisfied.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

.1 Internal Flood Protection (71111.06S)

a. Inspection Scope

The inspectors reviewed PPL's internal flooding evaluation, flood mitigation procedures, and design features, to verify whether they were consistent with the SSES design requirements and industry standards. The inspectors walked down selected risk significant plant areas to verify whether room flood detectors, watertight doors, sump pumps, and other flood protection design features were adequate and operable. During the walk downs, the inspectors also evaluated whether there were any unidentified or unanalyzed sources of flooding, including holes and un-sealed penetrations in floors and walls, between flood areas, and between common drain systems and sumps and the flood areas. The specific areas included:

- Units 1 and 2 reactor building closed cooling water (RBCCW) system area
- Units 1 and 2 turbine building closed cooling water (TBCCW) system area

The inspectors reviewed PPL's preventative maintenance tasks for room flood detectors, flood barriers, and watertight doors to evaluate whether component functionality was routinely verified. In addition, the inspectors reviewed PPL's corrective action program, including system health reports, and interviewed selected system engineers and maintenance personnel to verify whether previous flood related issues had been appropriately identified, evaluated, and resolved. The specific procedures and documents reviewed included:

- NDAP-QA-0409, "Door, Floor Plug, and Hatch Control," Attachments A & C
- RBCCW and TBCCW alarm response procedures for "HX Area Flooded"
- ON-169-001, "Flooding in the Turbine Building"
- ON-169-002, "Flooding in the Reactor Building"
- EO-000-104, "Secondary Containment Control"
- Design Basis Document DBD-010, "HELB, MELB, and Internal Flooding"
- FSAR Section 9.2.7.3, "Ultimate Heat Sink - Safety Evaluation"
- FSAR Section 9.3.3, "Equipment and Floor Drainage System"
- NPE-91-001, Section F.4, "SSES Individual Plant Evaluation - Internal Floods"
- EC-PIPE-1032, Section 4.6, "Moderate Energy Pipe Crack Evaluation - Rx Bldg"
- Maintenance Rule Basis Document for Plant Leak Detection System-76D
- RTPMs C1981-01, C4456-01, C7035-01, and C5588-01

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On October 16, the inspectors observed licensed operator performance in the simulator during the operator re-qualification annual examinations. In addition, the inspectors evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. The inspectors compared their observations to Technical Specifications, emergency plan implementation, and the use of emergency operating procedures. The inspectors' evaluation focused on the operating crew's satisfactory completion of crew critical tasks. Critical tasks are operational limits placed on key reactor plant and containment parameters that will ensure safety margins are maintained during the simulated malfunctions. In addition, the inspectors reviewed the ability of the simulator to model the actual plant performance. The observed training scenario's included:

- Loss of Unit 2 startup transformer T-20, reactor protection system failure to scram the reactor (ATWS), loss of Unit 1 startup transformer T-10 resulting in a loss of off-site electrical power (LOOP), failure of the "A" and "D" emergency diesel generators to automatically start, and a failure of the HPCI system

- Reactor core isolation cooling (RCIC) and HPCI system steam leak detection high temperature, HPCI outboard steam isolation valve failed to close, and a steam release to the atmosphere from the HPCI blowout panel

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

.1 Routine Maintenance Effectiveness Observations

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. The following issues were reviewed:

Equipment Issues

- Unit 2 reactor core isolation cooling (RCIC) turbine exhaust check valve found stuck open during suppression chamber gas leakage troubleshooting (CR 434223)
- Unit 2 scram discharge volume vent and drain valve failures; the inboard valves were slow to re-open after a reactor scram signal was reset (CRs 186283, 52697, and 425719)
- Unit 1 HPCI full flow test valve failure to open during a quarterly system full flow test and valve stroke surveillance test (CR 437525)

Procedures and Documents

- Maintenance Rule Basis Documents for RCIC, HPCI, and control rod drive (CRD) systems
- System Health Reports for RCIC, HPCI, and CRD
- NDAP-QA-0413, "SSES Maintenance Rule Program"
- EC-RISK-0528, "Risk Significant SSCs for the Maintenance Rule"
- EC-RISK-1054, "Maintenance Rule SSC Availability Performance Criteria"
- EC-RISK-1060, "Risk Significant SSC Acceptable Failure Limits"
- NDAP-QA-0510-2, "Troubleshooting Control Form for the Unit 2 RCIC Turbine Exhaust Line Leakage"

b. Findings

No significant observations or findings were identified.

.2 Emergency Lighting System

a. Inspection Scope

The inspectors evaluated PPL’s work practices and preventative maintenance activities for the emergency lighting system to assess the effectiveness of PPL's maintenance activities. The inspectors reviewed the performance history of the emergency lighting system to assess PPL’s problem identification and the adequacy of PPL's corrective actions to evaluate whether PPL had appropriately monitored, evaluated, and dispositioned issues in accordance with PPL procedures and the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance." The inspectors reviewed the associated system design bases, including the Final Safety Analysis Report (FSAR) and the Fire Protection Review Report (FPRR), to assess the adequacy of PPL's actions. In addition, the inspectors performed field walkdowns to verify whether the identified actions were appropriately performed. The following documents were included in the review:

Procedures and Documents

- Maintenance Rule Basis Document for emergency lighting system
- System Health Report for emergency lighting system
- NDAP-QA-0413, "SSES Maintenance Rule Program"
- NDAP-QA-0302, "System Status and Equipment Control"
- FSAR section 9.5.3.1, "Lighting System Design Basis"
- FPRR section 5, "Comparison of SSES Design to Regulatory Requirements"
- EL-63-1 thru 8, "Lighting - Reactor Building Unit 1"
- E-26, sheet 14, "Emergency Lighting Distribution Panel Schematic"
- Condition Reports 432446, 435827, 435985, and 437942

b. Findings

Introduction

The inspectors identified a non-cited violation of very low safety significance (Green) of 10 CFR 50.65(a)(2), the Maintenance Rule, because PPL did not demonstrate the effectiveness of preventative maintenance for the Unit 1 and 2 emergency lighting systems and did not place the systems in a 50.65(a)(1) category and monitor against established goals. The systems' progressive degradation resulted in the majority of the system lamps being burnt out. Therefore, the 125 VDC emergency lighting systems were not capable of performing their intended function. In addition, a contributing cause of this finding was related to the Problem Identification and Resolution (PI&R) cross-cutting area.

Description

On November 25, 2002, the inspectors performed a field walkdown and identified that a majority of 125 VDC emergency lights were not functional (e.g., normally energized lights were not lit). The inspectors determined that the affected emergency lights would not have been available during a loss of off-site power (LOOP) or station blackout (SBO) event. The inspectors found more than 50 percent of the 125 VDC emergency lights burnt out in the Unit 1 reactor building, including all emergency lights burnt out on the common refuel floor and in the RCIC pump room. The burnt out emergency lights would have resulted in complete darkness in the RCIC room and on the refuel floor during an SBO event. In addition, the inspectors determined that the plant operators were not aware of this condition. Based on the overall number of emergency lights that were not functional, the inspectors concluded that the system could not reasonably perform its intended function.

The Susquehanna Unit-1 and Unit-2 125 VDC emergency lighting systems provided general area lighting in the reactor, turbine, control structure, and rad-waste buildings (approximately 300 emergency lights, with about 50 in each reactor building). The emergency lights were normally energized from local 120 VAC panels throughout the plant, and automatically switched to a dedicated 125 VDC battery when the 120 VAC power was lost (e.g., LOOP or SBO). The maintenance rule basis document stated that this system provided essential lighting for safe shutdown, control room evacuation during a LOOP (non-fire situation), and for station blackout emergency operating procedures.

PPL previously demonstrated, prior to 1999, that the emergency lighting system performance had been effectively controlled through the performance of appropriate preventive maintenance in accordance with 10 CFR 50.65 (a)(2). PPL originally assigned a specific work group to identify and replace burnt out lights. When this group was relieved from these duties in 1998, PPL's preventive maintenance program changed to relying on all other plant personnel to identify and report lighting problems. However, plant personnel did not adequately identify and report burnt out light bulbs.

After the inspectors notified the control room of this finding, PPL took immediate actions to have plant operators perform building walkdowns to identify the extent of the condition, and to have maintenance begin lamp replacements and system troubleshooting. PPL maintenance subsequently replaced more than 200 emergency lights that were burnt out. PPL entered this finding into their corrective action program as condition report 435985.

The inspectors subsequently determined that PPL neither performed any routine tasks, walkdowns, or adequate preventative maintenance activities that would verify whether the individual emergency lights were operable (i.e., lamps not burned out), nor established goals to provide reasonable assurance that the system would fulfill its intended function. PPL's maintenance rule program (10 CFR 50.65), for the emergency lighting system, did not specifically address the system's light bulbs. PPL entered this finding into their corrective action program as condition reports 435827 and 437942.

Analysis

This finding was more than minor because it had greater significance than a similar issue described in NRC Inspection Manual Chapter 0612 Appendix E, "Examples of Minor Issues," section 1.f, in that PPL's maintenance rule (a)(2) demonstration became invalid as a result of PPL's failure to consider a maintenance preventable functional failure (MPFF) of the lighting system. PPL did not have a demonstration that the performance or condition of the lighting system light bulbs were effectively controlled through performance of effective preventive maintenance since 1998. In addition, this finding affected the mitigating systems cornerstone objective, to ensure available and reliable mitigating systems to respond to initiating events. A lack of emergency lights had a direct relationship to the cornerstone's objective because the finding affected the cornerstone's human performance attribute, in that post-event human errors could reasonably increase.

A contributing cause of this finding was related to the PI&R cross-cutting area. Plant personnel (operations, system engineering, and maintenance) did not identify and report numerous emergency lights which had burnt out. The lack of problem identification contributed to the systems' progressive degradation. The causal relationship between this finding and the cross-cutting area was that plant personnel did not identify that numerous emergency lights were not functional and, as a result, the systems degraded to a point where they could not perform their intended functions.

This finding was considered to have very low safety significance (Green) using the NRC's Significance Determination Process (SDP) for Reactor Inspection Findings for At-Power Situations because the finding did not contribute to a loss of mitigation equipment

functions and did not increase the likelihood of a fire or flooding event. In addition, during the period that the emergency lights were unavailable, there was no actual loss of normal lighting.

Enforcement

10 CFR 50.65 paragraph (a)(1), required, in part, that the performance or condition of SSCs shall be monitored against established goals, to provide reasonable assurance that such SSCs are capable of performing their intended functions.

10 CFR 50.65 paragraph (a)(2), required, in part, that monitoring as specified in paragraph (a)(1) was not required where it had been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance such that the SSC remains capable of performing its intended function.

Contrary to the above, as of November 25, 2002, PPL did not demonstrate that the performance of the 125 VDC emergency lighting systems had been effectively controlled through the performance of appropriate preventive maintenance, as required by 10 CFR 50.65(a)(2), and did not monitor the systems' performance against established goals, as required by 10 CFR 50.65(a)(1). Specifically, the majority of the emergency lights (more than 200 of 300 lights) were not functional, to the extent that the system could not reasonably perform its intended function. Therefore, the inspectors concluded that the condition of the emergency lighting system had not been effectively controlled through the performance of appropriate preventive maintenance and, as a result, that goal setting and monitoring was required by 10 CFR 50.65(a)(1).

Because this finding was of very low safety significance and PPL entered this finding into their corrective action program, this finding is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 50-387,388/2002-006-01)**

1R13 Maintenance Risk Assessment and Emergent Work (71111.13)

.1 Routine Risk Assessments

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 issue. The inspectors performed control room and field walkdowns to verify whether the compensatory measures identified by the risk assessments were appropriately performed. The selected maintenance activities included:

- Unit 1 "B" average power range monitor (APRM) work, including an unplanned APRM power supply failure during the planned I&C work, on November 14 & 15
- Unit 2 SDV vent and drain valve slow stroke close, on December 12
- Unit 2 main turbine #1 control valve and #1 combined intermediate valve failure to stroke during routine surveillance test (CRs 438927, 438931, and 438968), on December 16 and 20
- Units 1 and 2 planned maintenance in conjunction with a snow fall of 15 inches, on December 25 and 26

b. Findings

No findings of significance were identified.

.2 Emergency Lighting System Battery Replacement

a. Inspection Scope

The inspectors assessed PPL's system status and equipment control during the Unit 1 emergency lighting system battery replacement to determine whether appropriate compensatory actions had been identified and taken. The inspectors reviewed the associated system design bases, including the Final Safety Analysis Report (FSAR), Fire Protection Review Report (FPRR), and the emergency lighting system battery replacement modification ECO 397577 to assess the adequacy of identified compensatory actions. The inspectors also performed field walkdowns to verify whether the identified actions were performed appropriately. In addition, 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 following documents were included in the review:

Procedures and Documents

- NDAP-QA-0302, "System Status and Equipment Control"
- ECO 397577, "1D135 Emergency Lighting Battery Replacement Modification"
- TP-107-001, revision 0, "Re-test for ECO 397577, Unit 1 125 VDC Emergency Lighting System"
- PCAF 2002-1695 to TP-107-001
- FSAR section 9.5.3.1, "Lighting System Design Basis"
- FPRR section 5, "Comparison of SSES Design to Regulatory Requirements"
- Maintenance Rule Basis Document for emergency lighting system
- E-26, sheet 14, "Emergency Lighting Distribution Panel Schematic"
- Condition Reports 432446, 432473, and 432605

b. Findings

Introduction

The inspectors identified a non-cited violation of very low safety significance (Green) of Technical Specification 5.4.1, with two examples, because PPL did not implement their written procedures for the fire protection program (i.e., ECO 397577) and control of plant equipment (i.e., NDAP-QA-0302). As a result, PPL did not perform required compensatory actions, during replacement of the Unit 1 emergency lighting system 125 VDC battery. In addition, a contributing cause of this finding was related to the Human Performance cross-cutting area.

Description

On November 7, 2002, the inspectors identified that the control room operators were unaware that the Unit 1 emergency lighting system 125 VDC battery (1D135) had been taken out of service and was physically removed from the plant. A Unit Supervisor authorized the removal of the battery from service on November 4. Maintenance personnel disconnected the battery on November 5, and removed the battery from the plant on November 6. The inspectors determined that the affected Unit 1 emergency lights would not have functioned during LOOP or SBO event. In addition, the inspectors determined that the control room operators erroneously believed that the emergency lighting battery was in-service, with only the battery charger out of service for maintenance. During this condition, ECO 397577, "1D135 Emergency Lighting Battery Replacement Modification," required that portable sealed beam hand lights be provided in place of the inoperable emergency lights during the battery replacement. The inspectors concluded that the required compensatory measures were not implemented because the control room operators did not know that the 125VDC battery (1D135) was disconnected and the emergency lights were inoperable.

The inspectors identified one example of a failure to follow procedures, in that, plant operators had not maintained adequate status control of the emergency lighting system, as required by NDAP-QA-0302, "System Status and Equipment Control." NDAP-QA-0302 section 4.4.1 required, in part, that operators monitor and maintain status of plant systems. The operators did not know that the 125VDC battery (1D135) had been taken out of service and physically removed, which rendered the Unit 1 emergency lights inoperable.

The inspectors identified a second example of a failure to follow procedures, in that, compensatory actions required by ECO 397577 had not been performed. ECO 397577, "Design Inputs and Considerations," item 27, "Failure Effects Requirements Considerations," required that portable sealed beam hand lights be provided in place of the emergency lights during the battery replacement. However, the required portable sealed beam hand lights had not been provided.

After the inspectors notified the control room of this finding, PPL Operations took immediate actions to have plant operators carry flashlights (some operators do not routinely carry flashlights), and the system status was updated on the operators' turnover logs. In addition, PPL placed portable sealed beam hand lights throughout the plant. PPL entered this finding into their corrective action program as condition report 432446.

The Susquehanna Unit-1 125 VDC emergency lighting system provided general area lighting in the reactor, turbine, control structure, and rad-waste buildings (approximately 180 emergency lights, with about 50 in the reactor building). The emergency lights were normally energized from local 120 VAC panels throughout the plant, and automatically switched to a dedicated 125 VDC battery when the 120 VAC power was lost (e.g., LOOP or SBO). The maintenance rule basis document stated that this system provided essential lighting for safe shutdown, control room evacuation during a LOOP (non-fire situation), and for station blackout emergency operating procedures. The battery was scheduled to be out of service for a two week period while installing a new battery.

PPL determined that FSAR section 9.5.3.1, "Lighting System Design Bases," stated that this emergency lighting system was required for an SBO event, and that FPRR Table 5.0-1 stated that compensatory actions were to be taken when the emergency lighting system was out of service (condition report 432446). PPL revised TP-107-001 (battery replacement procedure) to add specific steps to place portable sealed beam hand lights throughout the plant, whenever the emergency lights were inoperable. PPL entered this finding into their corrective action program as condition report 432473, and completed the required compensatory actions within a day.

Analysis

This finding was more than minor because it affected the mitigating systems cornerstone objective, to ensure available and reliable mitigating systems to respond to initiating events. A lack of emergency lights had a direct relationship to the cornerstone's objective because the finding affected the cornerstone's human performance attribute, in that, post-event human errors could reasonably increase. Specifically, the human performance attribute was affected because the operators were

unaware of this condition, did not routinely carry flashlights, and portable sealed beam hand lights were not pre-staged throughout the plant. In addition, some of the plant areas would have been completely dark and challenged the operators' safe travel (e.g., increased the likelihood of an operator being unavailable due to injury).

A contributing cause of this finding was related to the Human Performance cross-cutting area. The causal relationship between this finding and the cross-cutting area was that plant operators did not follow procedures to monitor system status and control plant equipment and, as a result, did not perform required compensatory actions.

This finding was considered to have very low safety significance (Green) using the SDP for Reactor Inspection Findings for At-Power Situations because the finding did not contribute to a loss of mitigation equipment functions and did not increase the likelihood of a fire or flooding event. In addition, during the period that the emergency lights were unavailable, there was no actual loss of normal lighting.

Enforcement

Technical Specification 5.4.1 required, in part, that written procedures shall be established and implemented (1) as recommended in NRC Regulatory Guide (RG) 1.33 Appendix A, and (2) for the Fire Protection Program implementation. Contrary to the above, written procedures NDAP-QA-0302, "System Status and Equipment Control," and ECO 397577, "1D135 Emergency Lighting Battery Replacement Modification," were not implemented to monitor plant systems status and implement the Fire Protection Program instructions, respectively. The two examples of failure to follow procedures are:

(1) RG 1.33 Appendix A, section 1, "Administrative Procedures," item 1.c required procedures for equipment control. NDAP-QA-0302, "System Status and Equipment Control," section 4.4.1 required, in part, that operators monitor and maintain status of plant systems. However, operators had not maintained adequate status control of the emergency lighting system, because the operators did not know that the 125VDC battery (1D135) had been taken out of service and physically removed, which rendered the Unit 1 emergency lights inoperable, and

(2) ECO 397577, "Design Inputs and Considerations," item 27, "Failure Effects Requirements Considerations," required that portable sealed beam hand lights be provided in place of the emergency lights during the battery replacement. However, portable sealed beam hand lights had not been provided while the battery was out of service and the emergency lights were inoperable.

Because this violation was of very low safety significance and PPL entered this finding into their corrective action program, this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 50-387/2002-006-02)**

1R14 Non-Routine Plant Evolutions (71111.14)

.1 Unit 2 Reactor Scram due to Loss of Main Condenser Vacuum

a. Inspection Scope

On September 30, an automatic reactor shutdown occurred due to a main turbine trip. The turbine trip was caused by low main condenser vacuum, following a loss of the main condenser offgas removal system. The loss of the offgas system was due to a loss of electrical power from a 120 volt AC un-interruptible power supply (UPS), 2D130. PPL was performing planned maintenance on 2D130 when the loss of electrical power occurred.

The inspectors reviewed the operator actions, plant response, and plant procedures related to the "A" reactor recirculation pump runback, "B" reactor recirculation pump lockup without runback, and subsequent automatic reactor shutdown (scram) from 72% reactor power. The review focused on the cause of the offgas system trip, planned maintenance work on the 2D130 UPS, operator actions to restore condenser vacuum prior to the scram, and operator actions to stabilize the reactor plant following the scram. The following documents were included in the review:

Procedures and Documents

- OP-AD-327, "Post Reactor Transient/Scram/Shutdown Evaluation"
- OP-257-002, "Un-interruptible Power Supply 2D130 for Panel 2Y128"
- ON-264-002, "Loss of Reactor Recirculation Flow"
- Unit 2 Control Room Operator Logs
- Unit 2 Technical Specifications
- Event Notification Report 39233
- Final safety Analysis Report, Section 8.3.1.8, "Non-Class 1E Instrument and Vital AC Power Supply"
- Maintenance Work Instruction 107403 for UPS 2D130
- Condition Reports 425608 and 427396

b. Findings

No findings of significance were identified.

.2 Unit 2 Reactor Scram and Unusual Event due to Startup Transformer Failure

a. Inspection Scope

On October 3, 2002, the Unit 2 startup transformer (T-20) failed (explosion and fire), which resulted in a loss of one of the two Technical Specification required off-site power sources for both Unit 1 and Unit 2. The Unit 2 reactor was manually shutdown (scrammed) due to the loss of both reactor recirculation pumps. At the time of the scram, a Unit 2 startup was in progress, with the reactor critical at approximately two percent power. The recirculation pumps tripped due to a power loss caused by the transformer failure. The transformer explosion resulted in the declaration of an Unusual Event, the lowest of four emergency classifications.

The inspectors reviewed the operator actions, plant response, and plant procedures related to the T-20 transformer failure, manual reactor scram, and subsequent Unusual Event declaration. The review focused on the cause of the transformer's failure, communication of information by on-site and off-site personnel, and the event's impact on station personnel and equipment.

In addition to the resident inspectors' review, a regional emergency preparedness (EP) inspector reviewed PPL's response to the event. The EP inspector's review included interviews with the shift manager (acting as emergency director), security supervisor, plant manager, and the control room communicator. The inspectors also interviewed PPL personnel who conducted the event follow-up investigation and the NRC operations officer who received the event notification from PPL. The following documents were included in the review:

Procedures and Documents

- ON-264-002, "Loss of Reactor Recirculation Flow"
- Units 1 and 2 Control Room Operator Log
- Technical Specifications 3.4, "Reactor Coolant System"
- Event Notification Reports 39241 and 39242
- OP-AD-327, "Post Reactor Transient/Scram/Shutdown Evaluation"
- Emergency Plan and Implementing Procedures
- Emergency Action Level Classification Scheme
- ON-000-010, Revision 5, "Security Event"
- NDAP-QA-0300, "Conduct of Operations"
- NDAP-QA-0777, "Conduct of Nuclear Emergency Planning"
- NDAP-QA-0720, "Event Notifications"
- Condition reports 426454, 426247, 428348, 428827, 426083, 427105, 426075, 427396, and 426275

b. Findings

Introduction

The inspectors identified a non-cited violation of very low safety significance (Green) of 10 CFR 50.54(q), emergency planning standard 10 CFR 50.47(b)(4), and PPL's Emergency Plan, Section 5.1, because PPL did not adequately implement their emergency plan procedures to evaluate plant conditions and classify the event within a reasonable time period, for an actual Unusual Event.

PPL's initial assessment of plant conditions was not very extensive. PPL did not obtain sufficient information, available from security and other plant personnel, related to the transformer failure (explosion and fire), to adequately evaluate plant conditions against the appropriate Emergency Plan classification criteria. As a result, there was an unnecessary delay (approximately 34 minutes) before the shift manager (SM) became aware that an explosion had occurred, which requires an Unusual Event Classification. Within 15 minutes after the SM knew that an explosion had occurred, PPL activated their on-shift Emergency Response Organization (ERO), and declared an Unusual

Event. Accordingly, the on-shift ERO activation and subsequent notification to off-site agencies was delayed unnecessarily.

Event Description

On October 3, at 2:31 a.m., the Unit 2 startup transformer (T-20) exploded and caught fire. Several plant personnel heard two explosions and witnessed a fire at T-20. Personnel at the scene attempted to report the information to the main control room, but were unsuccessful because the telephone they tried to use had lost power due to the event. A maintenance technician announced the fire via the plant's public address system, which was overheard by control room personnel. Although the control room operators immediately responded to the overheard fire announcement, they did not attempt to obtain more details of the T-20 failure by talking with the technician or any other personnel who had been near the transformer.

Unit 2 was manually shutdown, as required by procedure, and the on-site fire brigade was immediately activated to respond to the transformer fire. The fire was automatically extinguished within 10 minutes by the transformer's fire water deluge system.

At 2:33 a.m., a security officer, near T-20, reported hearing two explosions to the security control center. At 2:41 a.m., an individual, one half mile from the plant, reported that he felt the blast from the explosion. This information was reported to the PPL's alternate security control center. In both cases, the information of an explosion was not reported to the control room.

PPL evaluated the transformer fire against the criteria in emergency action level (EAL) 14.1, "Fire or Explosion," to determine whether to activate the on-shift ERO and declare an Unusual Event (UE). EAL 14.1 stated, in part, that the criteria for an Unusual Event classification was "a fire lasting more than 15 minutes OR an explosion inside the security protected area with no significant damage to station facilities." Since the control room was unaware that an explosion had also occurred, the SM only evaluated the fire condition and concluded that no emergency condition existed because the fire only lasted for 10 minutes. Consequently, PPL did not activate the on-shift ERO.

At 2:43 a.m., the security shift supervisor informed the SM that, as a precaution, he had activated PPL's security response plan, secured the T-20 transformer area as a potential crime scene, and had requested off-site law enforcement assistance. The security supervisor did not recall whether he told the SM that there was an explosion at the transformer. The SM incorrectly assumed that the security response was due to activation of the fire brigade and did not question the security supervisor for a more detailed explanation.

At 3:05 a.m., control room operators overheard a returning fire brigade member state that plant personnel had heard a loud bang prior to the fire. Based on this new information, the SM re-evaluated the plant conditions against the EAL 14.1 criteria, with respect to an explosion.

At 3:15 a.m., the SM declared an Unusual Event and activated the on-shift ERO. At this point in time, the SM assumed the emergency director position and assigned the on-

shift ERO positions within the control room. However, activation of PPL's on-shift ERO and the Unusual Event declaration was made 44 minutes after the transformer exploded, because of PPL's limited initial assessment. The event was terminated at 5:52 a.m. A subsequent investigation determined that the fire was caused by a transformer fault, that resulted in the rupture of the metal tap changer compartment and expulsion of oil from the transformer, which initiated the fire.

Analysis

This finding was more than minor because it affected the Emergency Preparedness cornerstone objective, to ensure that PPL is capable of implementing adequate measures to protect public health and safety in response to an actual event. Contrary to plant procedures, PPL did not perform a more extensive evaluation, using all available information during an actual event. This performance deficiency had a direct relationship to the cornerstone's emergency response organization performance attribute, and resulted in delayed activation of PPL's on-shift ERO and delayed notification to off-site agencies.

This finding was considered to have very low safety significance (Green), and was not greater than very low safety significance because the performance issue occurred during an actual Unusual Event and did not occur during a higher emergency classification. The issue was evaluated using the Emergency Preparedness significant determination process.

Enforcement

10 CFR 50.54(q) required, in part, that "a licensee authorized to operate a nuclear power reactor shall follow and maintain in effect emergency plans which meet the standards in 50.47(b)." 50.47(b)(4) required, in part, that "a standard emergency classification and action level scheme" be in use. Specifically, PPL Emergency Plan, Section 5.1, "Classification System," stated, in part, that "in many cases, the proper classification is immediately apparent from in-plant instrumentation. In other cases, more extensive assessment is necessary to determine the applicable emergency classification. Continuing reassessment is required to ensure that the classification is consistent with the conditions."

Contrary to the above, PPL did not perform an extensive assessment as necessary to determine the applicable emergency classification. Specifically, the Shift Manager did not obtain all the initially available information from security and other plant personnel who were in the area near the T-20 transformer on October 3, 2002, when it exploded and caught fire. As a result, there was a delay (approximately 34 minutes) before the Shift Manager understood that an explosion had occurred. The delay in classifying the event resulted in an unnecessary delay in activating PPL's on-shift ERO, declaration of an Unusual Event, and notification to off-site agencies.

This finding did not present an immediate safety concern. Because this violation was of very low safety significance and PPL entered this finding into their corrective action program, as condition report 428348, this violation is being treated as a non-cited

violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 50-387,388/2002-006-03)**

.3 Emergency Response Organization Performance during an Unusual Event

a. Inspection Scope

On October 3, 2002, the Unit 2 startup transformer (T-20) failed, which resulted, in part, in activation of PPL's Emergency Response Organization (ERO) and an Unusual Event declaration.

The inspectors reviewed the Unusual Event declaration related to the T-20 transformer explosion. The review focused on PPL's activation of their on-shift ERO and the communication of information to off-site agencies. In addition to the resident inspectors' review, a regional emergency preparedness (EP) inspector reviewed PPL's response to the event. The EP inspector's review included interviews with the shift manager (emergency director), security supervisor, plant manager, and the control room communicator. The following documents were included in the review:

Procedures and Documents

- Event Notification Reports 39241 and 39242
- Emergency Plan and Implementing Procedures
- Emergency Action Level Classification Scheme
- NDAP-QA-0300, "Conduct of Operations"
- NDAP-QA-0720, "Event Notifications"
- Condition reports 426454 and 428348

b. Findings

Introduction

The inspectors identified a non-cited violation of very low safety significance (Green) of 10 CFR 50.54(q), emergency planning standard 10 CFR 50.47(b)(2), PPL's Emergency Plan, Section 6.0 and Table 6.1, and NDAP-QA-0300, because PPL did not use a trained person as the control room communicator during an actual event, as required by procedures. In addition, the untrained individual did not provide the NRC with the correct basis or reason for the Unusual Event classification.

Event Description

On October 3, 2003, during an Unusual Event the SM assigned a unit supervisor (US) to perform the control room communicator function, instead of using the pre-designated plant control operator (PCO), as required by the Emergency Plan. At the time, there were 6 PCOs, trained as control room communicators, in the control room. A review of training records, after the event, indicated that the assigned US had not completed the training requirements to qualify as a control room communicator. The SM replaced the

pre-designated PCO, who was trained and qualified, with an untrained individual for the communicator position.

When the communicator notified the NRC Operations Officer of the event, he stated that the Unusual Event was based on a fire lasting greater than 15 minutes. However, the Unusual Event was based on the transformer explosion (see Section 1R14.2 above) and not a fire. Later in the event, the communicator provided an update to the NRC and again stated the Unusual Event was based on a fire.

Analysis

This finding was more than minor because it affected the Emergency Preparedness cornerstone objective, to ensure that PPL is capable of implementing adequate measures to protect the health and safety of the public in response to an actual event. Contrary to plant procedures, PPL did not use a trained person to perform the control room communicator function during an actual event. This performance deficiency had a direct relationship to the cornerstone's emergency response organization performance attribute, in that the untrained individual provided the wrong reason for the event classification to the NRC.

A contributing cause of this finding was related to the Human Performance cross-cutting area. The causal relationship between this finding and the cross-cutting area was that plant operators did not follow procedures to use a trained individual as the control room communicator.

This finding was considered to have very low safety significance (Green), and was not greater than very low safety significance because the performance issue occurred during an actual Unusual Event and did not occur during a higher emergency classification. The issue was evaluated using the Emergency Preparedness significant determination process.

Enforcement

10 CFR 50.54(q) required, in part, that "a licensee authorized to operate a nuclear power reactor shall follow and maintain in effect emergency plans which meet the standards in 50.47(b)." 50.47(b)(2) required, in part, that on-shift responsibilities for emergency response are defined and adequate staffing is provided. Specifically, PPL Emergency Plan, Section 6.0, "Organizational Control of Facilities," states, in part, that the "on-shift organization has been staffed and trained to be capable of ...effectively responding to an emergency condition." Emergency Plan, Table 6.1, "Station Personnel Emergency Activity Assignments," designated a plant control operator (PCO) for communications. NDAP-QA-0300, "Conduct of Operations," Attachment B, states, in part, that the Control Room Communicator was staffed by a PCO who is pre-designated to the position prior to every shift, or with an individual who had training for that position.

Contrary to the above, during the Unusual Event on October 3, 2002, PPL did not use the pre-designated PCO to perform the control room communicator function. Instead, PPL used an untrained non-PCO individual to perform the communicator function during a declared Unusual Event.

This finding does not present an immediate safety concern. Because this violation was of very low safety significance and PPL entered this finding into their corrective action program, as condition report 426454, this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 50-387,388/2002-006-04)**

1R15 Operability Evaluations (71111.15)

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, Final Safety Analysis Report (FSAR), and associated Design Basis Documents as references during these reviews. The issues reviewed included:

- Unit 2 main steam isolation valve (MSIV) HV-241-F022B stroke time less than Technical Specification limit, during surveillance test (CR 426803), on October 8
- Unit 2 "B" reactor protection system (RPS) alternate electronic protection assembly (EPA 2CB-S003A-A) breaker evaluation, after the redundant EPA breaker (2CB-S003A-C) failed to trip during surveillance test, (CR 429174), on October 21
- Emergency diesel generator (EDG) common mode failure evaluation, after the "A" EDG tripped during the monthly surveillance run (CR 430146), on October 28
- Unit 2 primary containment integrity evaluation, in response to suppression chamber air leakage from the RCIC turbine exhaust line (CR 434223), on October 18
- Unit 2 scram discharge volume (SDV) vent and drain valve evaluations, after the valves were slow to re-open following a reactor scram (CR 437717), on December 9
- Reactor pressure vessel in-service visual inspections not performed as required by ASME Code (CR 438572), on December 13

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds (71111.16)

a. Inspection Scope

The inspectors reviewed the significant control room deficiencies, status control tags, and selected corrective action reports to determine whether the functional capability of a system or a human reliability response during an event would be affected. The review was focused on Unit 2 because of additional degraded equipment compared to Unit 1.

The inspectors reviewed the operators' response to two Unit 2 reactor shutdowns (scrams) on September 30, and October 3, 2002, to determine if existing operator work-arounds impacted the operators response.

The inspectors also reviewed operations procedure OI-AD-096, "Operator Work-Arounds," Revision 3, and the most recent operator work-around master list, dated December 16, 2002. The list of operator work-arounds was moved to the equipment performance and material condition list (EMPC). This review focused on the operators' ability to implement abnormal and emergency operating procedures during postulated plant transients with the existing equipment deficiencies. The review included an evaluation of the cumulative effects of the identified operator work-arounds.

The most risk significant operator work-arounds included:

- Unit 2 condensate transfer water supply to the emergency core cooling systems to prevent system water hammer and maintain operability
- Unit 2 main turbine turning gear is inoperable and could require operators to break main condenser vacuum after a turbine trip/reactor scram to prevent damage to the turbine
- Unit 2 "A" reactor recirculation pump discharge bypass valve is stuck closed. The ability to restart a reactor recirculation pump after a pump trip/reactor scram is more complicated due to the valve's condition
- Unit 2 main steam safety relief valve leaks, that result in frequent operation of the residual heat removal (RHR) system in the suppression pool cooling mode, and elevated suppression pool water temperatures

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

.1 Unit 1 & 2 HPCI Pump Suction Auto-transfer from the CST to Suppression Pool

a. Inspection Scope

The inspectors reviewed the HPCI system modification which eliminated the logic for the automatic transfer of the HPCI pump suction from the condensate storage tank (CST) to the suppression pool on high suppression pool water level.

The inspectors reviewed the modification design inputs and assumptions and PPL's license amendment request to verify that the design bases, licensing bases, and performance capability of HPCI had not been degraded by the modification. The inspectors compared their observations to the NRC's license amendment safety evaluation to assess the design adequacy.

The inspectors reviewed the modification work instructions and the post-modification test procedures and test acceptance criteria to assess whether the testing would verify that affected component interlocks and system functions satisfied regulatory and design

requirements, and to determine HPCI's readiness for operations. The inspectors reviewed the test data to evaluate whether the test acceptance criteria were satisfied and whether any unintended system interactions had been identified.

The inspectors reviewed the affected procedures, design basis documents, and the Final Safety Analysis Report (FSAR) to verify that the affected documents were appropriately updated. In specific, the inspectors reviewed the emergency operating procedures to determine whether the potentially affected procedures had been reviewed and revised, as required. The following documents were included in the review:

Procedures and Documents

- DCPs 178307 and 178308, "HPCI Pump Suction Auto-transfer to Suppression Pool Logic Elimination"
- 50.59 Safety Evaluation Screen for DCPs 178307 and 178308
- LDCN 3292 for DCPs 178307/178308 (FSAR change notice)
- Technical Specifications Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation"
- FSAR Section 6.3.2.3.1, "HPCI System"
- Design Basis Document 004, "HPCI"
- NRC Safety Evaluation for PPL Facility License Amendments 204 (Unit 1) and 178 (Unit 2)
- EO-000-103, "Primary Containment Control"
- EO-1(2)00-032, "HPCI Operating Guidelines during Station Blackout"
- NDAP-QA-0330, "PSTG and Emergency Procedures"
- NDAP-QA-0331, "Verification of PSTG and Emergency Procedures"
- NDAP-QA-0332, "Validation of Emergency Procedures"
- Work Orders 346860, 346865, 346867, and 346871
- Condition Report 435523

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

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. The post maintenance testing activities reviewed included:

- Unit 2 startup transformer 13.8 kV circuit breaker (OA 10401) failed to close after breaker restoration, observed relay and test PMT (WO 426079) following troubleshooting, on October 10
- Unit 2 reactor protection system EPA breaker retest after breaker replacement WO 429270, on October 24
- Unit 1 RCIC system flow verification after the turbine exhaust check valve was removed and re-installed, on November 1
- Unit Common diesel driven fire pump (OP511) Performance Test (TP-013-034) and Monthly Diesel Driven Fire Pump Run (SO-013-001), after diesel fire pump overhaul, on November 22
- Unit 2 scram discharge volume (SDV) valve stroke after air regulator replacement, SO-255-002, on December 12

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

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. The observed or reviewed surveillance tests included:

- Unit 2 startup bus 20 feeder breaker protective relay calibration, on October 10
- Unit 1 RCIC quarterly flow verification after planned maintenance, SO-150-002, on November 1
- Unit 2 scram discharge volume (SDV) vent and drain valve quarterly operability check, SO-255-002, on December 10
- Unit 1 HPCI quarterly full flow test, in-field local observation, on December 6
- Unit Common "B" loop emergency service water quarterly flow verification, SO-054-B03, on November 19

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modification (71111.23)

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 Final Safety Analysis Report (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. The following temporary modifications and documents were included in the review:

Temporary Modifications

- Unit 2 HPCI system, temporary camera installation for remote monitoring of HPCI operation during quarterly HPCI turbine surveillance test, November 18
- Unit 2 Main Steam Line Temporary Pressure Instrument on Blind Pressure Switch PSL-B21-2N015C, December 2002
- Unit 2 Temporary Power Cables to Chemical Decontamination Equipment, on December 18-19 and 23
- Unit 2 Fuel Pool Cooling and Cleanup system abnormal line-up and operation, using a temporary procedure, during chemical decontamination, on December 18-20

Procedures and Documents

- T-Mod 429568, "Temporary Indication at Drain Valve from Pressure Switch PSL-B21-2N015C"
- T-Mod 429105, "Chemical Decon Temporary Power"
- NDAP-QA-0503, "General Housekeeping and Foreign Material Exclusion"
- NDAP-QA-1218, "Temporary Modifications"

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY
Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope

The inspector reviewed the high radiation area lock and key control program by reviewing applicable procedures, conducting a high radiation area key inventory, and testing selected locked high radiation area doors in the plant. This review was with respect to the high radiation area entry requirements specified in Technical Specification 5.7 and 10 CFR 20.1601 and applicable radiation surveys. The following documents were included in the review:

Procedures and Documents

- HP-TP-311, revision 23, "Locking, Barricading, and Key Control"
- NDAP-QA-0626, revision 3, "Radiologically Controlled Area Access and Radiation Work Permit System"
- Condition reports 425209 and 429831

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspector reviewed the following as low as reasonably achievable (ALARA) program activities through a review of documents and interviews with applicable staff:

- Susquehanna 2003 annual exposure estimate and methodology
- Spring 2003 Refueling Outage Radiation Work Permit and ALARA Pre-job Review Commitment Schedule
- Radiological monitoring instrumentation readiness to support remote monitoring for the Spring 2003 refueling outage
- ALARA condition reports (CR) associated with a November 2002 liquid radwaste filter replacement activity (CRs 436373, 436377, and 436378)
- Fuel pool and recirculation system chemical decontamination plans

The inspection review criteria utilized for this inspection area was with respect to the ALARA requirements in 10 CFR 20.1101(b).

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Reactor Safety Indicators

a. Inspection Scope

The inspectors reviewed PPL's performance indicator (PI) data to verify whether the PI data was accurate and complete. The inspectors examined selected samples of PI data, PI data summary reports, cornerstone assessment reports, and plant records, which included selected Technical Specification limiting condition for operation logs, licensee event reports, and condition reports for the previous twelve quarters. In addition, the inspectors interviewed the responsible system engineers. The inspectors

compared the PI data against the guidance contained in Nuclear Energy Institute (NEI) 99-02, revision 2, "Regulatory Assessment Performance Indicator Guideline." The following indicators and PPL documents were included in this review:

NRC Mitigating Systems Performance Indicators

- Emergency AC Power System Unavailability
- Reactor Core Isolation Cooling System Unavailability
- Residual Heat Removal System Unavailability
- Safety System Functional Failure

PPL Documents

- Units 1 and 2 Control Room Logs
- NDAP-QA-0737, "Regulatory Performance Assessment"
- LI-00-018, "Preparation of Performance Indicator Data, NRC Submittals, and Cornerstone Assessment Reports"
- SO-200-006, "Shiftly Surveillance Operating Log"

4OA2 Problem Identification and Resolution (71152)

.1 Occupational Radiation Safety

a. Inspection Scope

The inspector reviewed five Condition Reports (CRs) that were initiated from September through November 2002 and were associated with the occupational radiation safety cornerstone. The purpose of the review was to evaluate PPL's effectiveness at properly identifying, characterizing, investigating and resolving problems in implementing PPL's radiation protection program.

b. Findings

No findings of significance were identified.

.2 References to PI&R Findings

Section 1R12.2 of this report describes a finding for failure to identify numerous degraded conditions with the emergency lighting system. This finding may be indicative of a potential weakness in PPL's corrective actions program.

4OA3 Event Follow-up (71153)

.1 (Closed) LER 50-387/2001-001-00 Standby Liquid Control System Unable to Meet Requirements of ATWS Rule for a LOOP / ATWS Event

On March 1, 2001, the NRC identified that the standby liquid control (SLC) system design pressure was lower than the maximum pressure expected during a LOOP anticipated transient without a scram (ATWS) event. As a result, the SLC system sodium pentaborate solution injection rate would have been less than the value required by 10 CFR 50.62, the "ATWS Rule." PPL determined that the actual flow, although less than the required value, would have satisfied the ATWS Rule objectives. PPL modified Unit 1 and Unit 2 SLC systems, to increase the design pressure. The Unit 1 and Unit 2 SLC systems currently comply with the ATWS Rule requirements.

This NRC identified violation was documented and discussed in detail in NRC Inspection Report 50-387,388/2001-004, in section 1R21.2. Additional aspects of this issue will be dispositioned by NRC Unresolved Item URI 50-387/2001-004-003. The inspectors reviewed PPL's apparent cause evaluation and corrective actions taken and planned, to verify whether they appeared reasonable. No new issues were identified in the inspectors' review. This finding was documented in PPL's corrective action program as condition report 316780. This LER is closed.

4OA5 Other

.1 Interim Security Compensatory Measures

a. Inspection Scope

An audit of PPL's performance of the interim compensatory measures imposed by the NRC's Order Modifying License, issued February 25, 2002 was completed in accordance with the specifications of NRC Inspection Manual Temporary Instruction 2515/148, Revision 1, Appendix A, dated September 13, 2002.

b. Findings

No findings of significance were identified.

.2 Notice of Enforcement Discretion 2002-01-03

On October 3, 2002, the Unit 2 startup transformer (T-20) failed (see Section 1R14.2), which resulted in a loss of one of the two Technical Specification (TS) required off-site power sources for both Unit 1 and Unit 2. The Unit 2 reactor was immediately shutdown as a result of the transformer failure (recirculation pumps tripped due to loss of power), and Unit 1 remained at 100% reactor power. However, TS 3.8.1 required a unit shutdown when one off-site power source was inoperable for greater than 72 hours.

On October 5, PPL requested the NRC exercise discretion to not enforce compliance with TS 3.8.1, pursuant to the NRC's policy regarding exercise of discretion for an operating facility, in accordance with Section VII.C, of the "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The NRC issued Notice of Enforcement Discretion (NOED) No. 2002-01-03 to exercise discretion and not enforce compliance with TS 3.8.1.A.3, for a four day period starting on October 6, and ending at 2:30 a.m., on October 10. This allowed a 7 day period of time for PPL to replace T-20 and return it to service, while Unit 1 remained operating. On October 9, PPL concluded that the T-20 replacement activities would exceed the NOED allowed discretion time, and commenced a Unit 1 shutdown at 12:08 a.m., on October 10. The shutdown was halted at 30% reactor power, when T-20 was returned to service at 9:35 a.m., on October 10. Unit 1 was returned to full power on October 11.

The NOED approval basis and required compensatory measures were documented by NRC letter to PPL, dated October 8, 2002. The inspectors verified whether the required NOED actions were adequately performed. **(URI 50-387/2002-006-05)**

4OA6 Meetings

.1 Exit Meeting Summary

On January 7, 2003, the resident inspectors presented the inspection results to Mr. R. Anderson, Vice President - Nuclear Operations, and other members of PPL's staff, who acknowledged the findings.

The inspectors asked PPL whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1
SUPPLEMENTAL INFORMATION

a. Key Point of Contact

J. Fritzen, Radiological Operations Supervisor - Technical
J. Jessick, Health Physicist, Instruments
R. Kessler, Health Physicist, ALARA
D. Leddy, Health Physicist, ALARA
C. Madara, Health Physicist, ALARA
D. Miller, Chemist
D. Morgan, Senior Chemist
R. Rodriguez-Gilroy, Health Physicist, ALARA
R. Smith, Radiation Protection Manager
J. Grisewood, Supervisor, Nuclear Emergency Planning
M. Solomon, Security Supervisor
B. Boesch, Shift Manager
J. Tripolli, Nuclear Regulatory Affairs

b. List of Items Opened, Closed, and Discussed

Opened

None

Opened and Closed

50-387,388/2002-006-01	NCV	Failure to demonstrate the effectiveness of preventative maintenance nor set goals and monitor the Unit 1 and 2 emergency lighting systems. (section 1R12.2)
50-387/2002-006-02	NCV	Failure to implement written procedures for control of plant equipment and the fire protection program. (section 1R13.2)
50-387,388/2002-006-03	NCV	Failure to adequately implement Emergency Plan procedures for event classification, during an actual event (declared Unusual Event). (section 1R14.2)
50-387,388/2002-006-04	NCV	Failure to implement Emergency Plan procedures to use a trained individual for control room communicator, during an actual event (declared Unusual Event). (section 1R14.3)
50-387/2002-006-05	URI	Notice of Enforcement Discretion (NOED) 2002-01-03 to Exercise Discretion and Not Enforce Compliance with TS 3.8.1.A.3 (section 40A5.2)

Closed

50-387/2001-001-00	LER	Standby Liquid Control System Unable to Meet Requirements of ATWS Rule for a LOOP / ATWS Event (section 4OA3.1)

Discussed

None

c. List of Document Reviewed

Not Referenced in the Report

None

d. List of Acronyms

ALARA	As Low As Reasonably Achievable
APRM	Average Power Range Monitor
ATWS	Anticipated Transient without Scram
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive System
CS	Control Structure
CST	Condensate Storage Tank
EAL	Emergency Action Level
ED	Emergency Director
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPA	[RPS] Electronic Protection Assembly
ERO	Emergency Response Organization
FPRR	Fire Protection Review Report
FSAR	[SSES] Final Safety Analysis Report
HPCI	High Pressure Coolant Injection
ICM	Interim Compensatory Measures
LOOP	Loss of Off-site Electrical Power
NCV	Non-cited Violation
NOED	Notice of Enforcement Discretion
NRC	Nuclear Regulatory Commission
PCO	Plant Control Operator
PI	[NRC] Performance Indicator
PI&R	Problem Identification and Resolution
PPL	PPL Susquehanna, LLC
RB	Reactor Building
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RPS	Reactor Protection System

SBO	Station Blackout
SDP	Significant Determination Process
SDV	Scram Discharge Volume
SLC	Standby Liquid Control
SM	Shift Manager
SSC	Structure, System, or Component
SSES	Susquehanna Steam Electric Station
TB	Turbine Building
TBCCW	Turbine Building Closed Cooling Water
UE	Unusual Event
UPS	Un-interruptible Power Supply
US	Unit Supervisor
WO	Work Order