July 11, 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 05000387/2003003 AND 05000388/2003003

Dear Mr. Shriver:

On June 28, 2003, 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 Richard L. Anderson, Vice President - Nuclear Operations, and other members of your staff on July 3, 2003.

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 one self-revealing finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because the issue was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. If you contest the 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 NRC has issued five Orders (dated February 25, 2002, January 7, 2003 and April 29, 2003) and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance access authorization. The NRC 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 NRC 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 NRC 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 05000387/2003003, 05000388/2003003
w/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.: 05000387/2003003, 05000388/2003003

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station

Location: 769 Salem Boulevard
Berwick, PA 18603

Dates: March 30, 2003 to June 28, 2003

Inspectors: S. Hansell, Senior Resident Inspector
J. Richmond, Resident Inspector
P. Kaufman, Senior Reactor Inspector
R. Kuntz, Reactor Engineer
P. Frechette, Physical Security Inspector
D. Silk, Senior Emergency Preparedness Specialist

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

SUMMARY OF FINDINGS

IR 05000387/2003003, 05000388/2003003; 03/30/2003 - 06/28/2003; Susquehanna Steam Electric Station, Units 1 and 2. Post Maintenance Testing.

The report covered a 3 month period of inspection by resident inspectors, and announced inspections by reactor engineers, a physical security specialist, and an emergency preparedness specialist. One Green non-cited violation (NCV) was 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. NRC-Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- **Green.** A self-revealing non-cited violation of very low safety significance of Technical Specification 5.4.1 was identified, because PPL did not adequately implement their written procedures for post maintenance testing of a standby gas treatment system (SGTS) damper. On November 19, 2002, maintenance was performed on the damper and the damper was returned to an operable status without performing an adequate post maintenance or operational test. The inadequate test did not verify that the damper could perform its safety function after completion of maintenance activities. Four months later, PPL discovered that the damper could not perform its safety function. PPL corrected the condition and restored the damper to an operable condition.

  This finding is more than minor because it is similar to examples 1.a and 5.b in NRC Inspection Manual 0612 Appendix E, "Examples of Minor Issues." This violation is of very low safety significance because the finding only represented a degradation of the radiological barrier function provided by the SGTS. During the 4 month period, there were no events that required a SGTS actuation.

  A contributing cause of this finding was related to the Human Performance cross-cutting area, in that maintenance technicians and operators did not follow procedures to perform an adequate post maintenance test. As a result, the component was returned to service while in a degraded condition and was unable to perform its safety function. (Section 1R19.2)

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 May 2, reactor power was reduced to approximately 18% for planned maintenance to the main transformers. Reactor power was returned to 100% on May 5. On June 6, reactor power was reduced to approximately 30% for planned maintenance to repair a main turbine extraction steam line leak. Reactor power was returned to 100% on June 8. The unit operated at or near full power for the remainder of the inspection period, with exceptions for control rod pattern adjustments, main turbine control valve testing, and main condenser waterbox cleaning.

Unit 2 began the inspection period shutdown, in a maintenance and refueling outage. The unit was restarted on April 20, and achieved 100% reactor power on April 24. On June 11, a Technical Specification required shutdown was commenced, due to an inoperable control room emergency outside air supply system (section 1R14.2). The reactor shutdown was stopped at 98% power when the problem was corrected. Reactor power was returned to 100% on June 11, and operated at or near full power for the remainder of the report period, with exceptions for control rod pattern adjustments and main turbine control valve testing.

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

1R04 Equipment Alignments

.1 Partial System Walkdowns (71111.04Q)

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:

- "A," "B," "D," and "E" emergency diesel generator (EDG) governor, fuel racks, and air start subsystems, while "C" EDG inoperable - unable to pick up load
- Unit 2 reactor core isolation cooling (RCIC) system, while the high pressure coolant injection (HPCI) system was out of service for planned maintenance
- "A" EDG with one of two starting air compressor inoperable

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 2 reactor feed pump turbines
- Unit 2 reactor building main steam line tunnel
- Unit 2 condenser bay during outage
- Emergency service water pump house, security control center, and diesel & motor driven fire pump areas
- Unit 1 "B" residual heat removal pump room, during suppression pool cooling alignment
- "C" EDG, following EDG overhaul
- Unit 1 and Unit 2 lower relay rooms
- Unit 1 and Unit 2 battery rooms and DC distribution panel areas

Pre-fire Plans Procedures and Documents

- FP-213-278, "RFP Turbine A, B, C Rooms, TB Elevation 670"
- FP-213-253, "Main Steam Pipeway"
- FP-013-139, "Unit 1 Lower Relay Room"
- FP-013-142, "Unit 2 Lower Relay Room"
- FP-013-204, "Diesel Fire Pump Room"
- FP-013-205, "Fire and Service Water Pump Area"
- FP-013-360, "Security Control Center"
- FP-013-200/201, "ESSW Pump House"
- FP-113-105, "Unit 1 "B" RHR Pump Room"
- FP-013-195, "C" Diesel Generator Bay"
- FP-013-168 and 169, "Unit 1 Equipment and Battery Rooms"
- FP-013-170 and 171, "Unit 2 Equipment and Battery Rooms"
- NDAP-QA-0440, "Control of Transient Combustible & Hazardous Material"
- NDAP-QA-0441, "Fire Protection System Station Control"
- NDAP-QA-0449, "Fire Protection System Program"

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07B)

a. Inspection Scope

The inspector reviewed PPL's methods (inspection, cleaning, maintenance, and performance monitoring) used to ensure adequate heat removal capability of the Unit 2 residual heat removal (RHR) service water heat exchanger (2E205B), and the emergency diesel generator (EDG) A-E jacket water coolers (OE507A-E), lube oil coolers (OE506A-E), and inter-coolers (OE505A-D). Included in this review was a comparison to the commitments made in response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." In particular, the inspector reviewed various maintenance procedures to verify the cleaning and inspection activities, and their frequencies, were reasonable for ensuring that the heat exchangers were maintained capable of performing as designed.

The inspector reviewed the flow balance testing results of the emergency service water (ESW) system conducted on September 19, 2001, to verify that the surveillance test results were recorded and performance data adequately trended in-order to monitor for potential macro fouling conditions. The inspector compared the testing results to the acceptance criteria in procedure TP-054-076, "ESW Flow Balance."

The inspector reviewed the design fouling factor assumptions for the selected heat exchangers and the engineering analyses of minimum calculated flowrates. This review was performed to verify that the minimum calculated flowrates, in conjunction with the heat transfer capability of the heat exchangers, supported the minimum heat transfer rates assumed for the heat exchangers during normal and emergency shutdown conditions. The inspector also reviewed the eddy current test records for these heat exchangers, and verified that the number of plugged tubes in the heat exchangers was bounded by assumptions contained in the engineering analyses. The inspector reviewed these criteria to ensure that the minimum design bases assumptions were technically justified.

The chemical treatment program for the emergency service water and RHR service water systems was reviewed to verify that potential bio-fouling mechanisms had been adequately identified, corrective measures implemented when necessary, and results monitored for effectiveness. To assess the capability of these systems to support their normal and emergency functions, the inspector reviewed system health reports, monthly clam team reports, and the SSES Chemistry Manual, and held discussions with members of the chemistry department and the emergency service water system engineer. Additionally, the inspector performed a walkdown of the spray pond to assess the condition of the water.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On June 3, the inspectors observed licensed operator performance in the simulator during an emergency preparedness exercise. The inspectors assessed the operators' adherence to Technical Specifications (TSs), emergency plan implementation, and the use of emergency operating procedures. The inspectors' evaluation focused on the operating crew's satisfactory implementation of the emergency plan and emergency action level (EAL) classifications for the simulated equipment malfunctions. The inspectors reviewed the ability of the simulator to model the actual plant performance. In addition, the inspectors observed PPL's critique of the operators' performance. The observed emergency preparedness exercise included:

- Unusual Event declaration per EAL 16.1, "Security Event," due to a credible site-specific threat
- Alert declaration per EAL 16.2, "Security Event," due to an imminent credible site-specific threat
- Site Area Emergency declaration per EAL 4.3 "General," due to the Loss of Offsite Power in conjunction with a Loss of Coolant Accident

b. Findings

No findings of significance were identified.

1R12 Maintenance Implementation (71111.12Q)

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 Common "C" EDG failed to pick up load (CR 474234), during SE-024-C01, "Integrated DG Test"
- Unit 2 main steam system maintenance rule functional failures on automatic depressurization system (ADS) (CR 463478), during SE-283-005, "ADS Logic System Functional 24-month Test"; and safety relief valve (SRV) acoustic monitor system (CR 457812), during SI-283-326, "SRV Position Indication Channel Calibration 24-month Test"

Procedures and Documents

- Maintenance Rule Basis Documents for EDG and main steam systems
- System Health Reports for EDG and main steam systems
- NDAP-QA-0413, "SSES Maintenance Rule Program"
- Maintenance Rule Expert Panel meeting minutes, PLI-92576, dated June 12
- Condition Reports 474234, 457812, and 463478
- Work Orders 474276, 474275 and 474300

b. Findings

No significant observations or findings were identified.

1R13 Maintenance Risk Assessment and Emergent Work (71111.13)

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 2 "C" RFPT control system repairs, WO 471880
- Unit Common "A" EDG tripped while at full load, CR 475852
- Unit 2 HPCI planned on-line maintenance; Generic Safety Assessment GSA-052-005

- Unit 2 main turbine steam leak repair, CR 475398
- Unit Common "A" EDG air compressor inoperable and "E" EDG substituted for the "C" EDG due to a planned overhaul
- Unit Common "A" control structure (CS) chiller trip while "B" CS chiller was out of service for planned maintenance

b. Findings

No findings of significance were identified.

1R14 Non-Routine Plant Evolutions (71111.14)

.1 Unit 2 Feedwater Heater Train Isolation

a. Inspection Scope

On April 22, the Unit 2 "C" feedwater heater string was isolated, due to a suspected steam leak. As a result, feedwater temperature decreased to less than the minimum feedwater temperature used in the analysis for the minimum critical power ratio (MCPR). Operations entered TS 3.2.2 for MCPR, until the feedwater heater string isolation was completed. PPL entered this into their corrective action program as condition report 468816.

The inspectors reviewed operating logs, core thermal power limits, plant procedures, and interviewed plant personnel for this issue to independently determine what occurred and evaluate the initiating cause. The inspectors assessed personnel performance during this event to evaluate whether the operator response was appropriate and in accordance with procedures and training.

Procedures and Documents

- TS 3.2.2, "MCPR Core Thermal Limits"
- ON-247-001, "Loss of Feedwater Heating Extraction Steam"
- ON-247-002, "Loss of Feedwater Heater String"
- Condition Reports 468816, 468817, and 468820

b. Findings

No findings of significance were identified.

.2 Units 1 and 2 Technical Specification Required Shutdown due to Inoperable Control Room Emergency Ventilation System

a. Inspection Scope

On June 11, both divisions of the control structure (CS) chillers were inoperable when the "A" CS chiller tripped while the "B" CS chiller was out of service for planned maintenance. The control structure chillers are a safety related support system for the control room emergency outside air supply system, a safety system required by TS 3.7.3. At 12:17 p.m., both Unit 1 and Unit 2 entered TS 3.0.3, "Limiting Condition for Operations Not Met." PPL initiated a Unit 2 reactor shutdown at 1:15 p.m., as required by TS 3.0.3. The Unit 2 shutdown was stopped at 1:20 p.m., at approximately 98% reactor power, when the "B" CS chiller was returned to an operable condition. PPL entered this issue into their corrective action program as condition report 479166.

The inspectors reviewed operating logs, plant procedures, and interviewed plant personnel for this issue to independently determine what occurred and evaluate the initiating cause. The inspectors assessed personnel performance during this event to evaluate whether the operator response was appropriate and in accordance with procedures and training.

Procedures and Documents

- TS 3.7.3 and Basis, "Control Room Emergency Outside Air Supply System"
- TS 3.7.4 and Basis, "Control Room Floor Cooling System"
- Technical Requirements Manual 3.7.9 and Basis, "Control Structure HVAC"
- ON-030-001, "Loss of Control Structure HVAC"
- OP-030-001, "Control Structure Chilled Water System"
- Work Order 479163
- Condition Report 479166

b. Findings

No findings of significance were identified.

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 white substance identified on reactor vessel internals, CR 460592 and EWR 461695
- Unit 1 "A" core spray full flow test valve, HV-F015A, failed to close during quarterly surveillance, CR 466056
- Unit 1 and Unit 2 RHR operation in shutdown cooling mode, during a loss of offsite power, CR 473770
- Unit 1 and Unit 2 Fuel pool skimmer surge tank high make-up rate, CR 470365
- Unit 2 2D630 battery in equalize for extended period
- Unit Common "A" EDG tripped from full load during monthly surveillance test, CR 475852

b. Findings

No findings of significance were identified.

1R16 Operator Work-Around Cumulative Review (71111.16)

a. Inspection Scope

The inspectors reviewed the most 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 inspectors evaluated 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 and synergistic effects of the identified operator work-arounds. The following documents were included in the review:

Procedures and Documents

- OI-AD-096, revision 4, "Operator Work-Arounds"
- Equipment Performance and Material Condition (EPMC) List, "All Open Items Report"
- EPMC List, "Operator Work-arounds Report"
- EC-049-1051, "Peak Pressure in RHR Piping without Fill & Vent"
- OP-149-005, "RHR Suppression Pool Cooling"
- Condition Reports 468877 and 478776

More Significant Operator Work-arounds

- 480VAC load center breaker age related lubrication problem, could lead to loss of main turbine electro-hydraulic control system, main turbine trip with loss of bypass valves and reactor scram with loss of heat sink
- Control room telephone system does not support multiple users during a declared emergency, could result in delays in emergency communications
- Unit 2 reactor recirculation pump automatic speed run-back could place reactor core flow in Stability Region-2 of the power to flow map
- Reactor protection system transfer between the motor generator and the alternate supply requires standby safety systems to be manually started/stopped and safety features for primary containment isolation valves to be bypassed, to avoid automatic actuations during the power supply switching evolution

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17A)

.1 Unit 1 4kV Breaker Replacement

a. Inspection Scope

The inspectors reviewed the 4kV switchgear breaker modification which replaced the Westinghouse air magnetic circuit breakers (original plant equipment) with a Cutler Hammer vacuum circuit breaker.

The inspectors reviewed the modification work instructions, post modification test procedures, and test acceptance criteria to assess whether the testing would verify that affected breaker interlocks and system functions satisfied regulatory and design requirements. The inspectors observed portions of testing activities to verify whether the activities were properly performed in accordance with approved procedures. 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 and design basis documents to verify that the affected documents were appropriately updated. The following documents were included in the review:

Procedures and Documents

- DCP 375651, "4kV Switchgear Breaker Replacement"
- OP-000-001, revision6, section 4.1 "Breakers - Operability Policy"
- MT-GE-048, revision 0, "Cutler Hammer Type DHP-VR 4.16 KV Circuit Breaker Inspection and Maintenance"
- MT-GE-005, PCAF 2003-5120, "Cutler Hammer Circuit Breaker Seismic Restraints"

- TP-104-021, revision 0, "Initial Installation of Unit 1 ESS Bus Incoming Feeder Vacuum Circuit Breakers"
- Work order RLWO 478835
- Condition reports 481168 and 482609

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

.1 Routine Post Maintenance Testing Observations

a. Inspection Scope

The inspectors observed portions of post maintenance testing (PMT) 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 Main Turbine Over-speed testing, OP-293-002, after replacing the General Electric turbines with Siemens turbines
- Unit 2 "C" RFPT control signal failure and PDU replacement, WO 471880
- Unit Common "A" EDG retest after trip logic relay replacements, WO 475858 and SO-024-A01
- Unit Common "A" control structure chiller PMT after service water strainer cleaning, WO 300746

b. Findings

No findings of significance were identified.

.2 Standby Gas Treatment System Damper Failure

a. Inspection Scope

The inspectors observed portions of post maintenance testing (PMT) activities in the field, on April 17, 2003, for standby gas treatment system (SGTS) damper PDDM-075-54B, and reviewed the completed PMT records (WO 467651 and SE-170-011). The inspectors also reviewed the damper's previous PMT record (WO 400346) for a test conducted on November 19, 2002.

The inspectors assessed the tests' adequacy by comparing the test methodology to the scope of the maintenance work performed. In addition, the inspectors evaluated the test acceptance criteria to verify whether the criteria adequately demonstrated that the damper could perform its intended safety function. The inspectors also verified whether the tests were performed in accordance with the approved procedures, and reviewed the recorded test data to determine whether the acceptance criteria were satisfied. The following documents were included in the review:

Procedures and Documents

- MT-GE-030, "ITT Damper Hydramotor NH91/NH95 Overhaul"
- V-475 sheet-2, "SGTS Outdoor/Zone Pressure Differential Control Schematic"
- M334-46 sheet 2, "Wiring Diagram, Local Control Panel OC883B"
- SE-170-011, RTSV 464948, dated 04-17-03, "Secondary Containment Drawdown and In-leakage Test, Zones I & III"
- Work Orders 400346, 425144, and 467651
- Condition Reports 96-0336, 467613, 467829, 467830, and 468337

b. Findings

Introduction

A self-revealing non-cited violation of very low safety significance (Green) of Technical Specification 5.4.1 was identified, because PPL did not adequately implement their written procedures for the PMT of a SGTS damper (i.e., MT-GE-030 and NDAP-QA-0302). On November 19, 2002, maintenance was performed on the damper, and the damper was returned to an operable status without performing an adequate PMT or operational test to verify that the SGTS damper could perform its safety function after completion of maintenance activities. Four months later, PPL discovered that the damper could not perform its safety function.

Description

On April 16, 2003, damper PDDM-075-54B did not open when the "B" train of SGTS was actuated. This damper is in the flow path between the SGTS and secondary containment. The damper's safety function is to modulate the air flow from the secondary containment into the SGTS, to control reactor building pressure while SGTS is aligned to the secondary containment.

PPL determined that the control wiring of the damper actuator had been reversed when the actuator was last rebuilt. As a result of the wiring error, a control signal to open the damper caused the actuator to move the damper to the closed position. This actuator had been installed on the damper on November 19, 2002, four months earlier. As a result, the "B" train of SGTS was unavailable for 4 months, and both the "A" and "B" trains of SGTS were unavailable on four separate occasions (e.g., a safety system functional failure), when the "A" train of SGTS was removed from service for scheduled maintenance, during February 10 to 12, February 24 to 25, April 11, and April 12, 2003. The incorrect wiring condition was corrected and the damper restored to an operable status on April 16, 2003.

PPL concluded that it missed an opportunity to prevent the event when it did not perform an adequate PMT to verify damper functionality following the actuator replacement in 2002. Maintenance procedure MT-GE-030, section 8.9, "Actuator Installation and Adjustment," contained a specific installation sequence, including adjustment and wire re-connection steps. The last procedure step, in the installation sequence, required verification of proper damper operation, after all maintenance activities had been completed. However, PPL Maintenance performed the procedure steps out of sequence. PPL performed an in-place damper functional check, by locally stroking the installed damper with portable test equipment, then re-connected the field control wires.

In addition, NDAP-QA-0302, "System Status and Equipment Control," section 6.3.6, required Operations to identify and perform operational testing needed to verify Technical Specification operability, prior to equipment restoration. However, no additional operational testing (e.g., no damper stroke test) was identified or performed after all field wires were re-connected and all maintenance activities were completed to verify that the SGTS damper could perform its safety function. As a result of not performing the installation activities in the sequence specified by the maintenance procedure and not performing the required operational system testing after all field control wires were re-connected, the actuator control wire reversal problem was not identified and the damper was returned to service in an inoperable condition.

Analysis

This finding is a performance deficiency because PPL did not implement written procedures to verify that a safety related damper was functional following maintenance activities, and the damper subsequently failed to perform its safety function 4 months later. This finding is more than minor because it is similar to examples 1.a and 5.b in NRC Inspection Manual 0612 Appendix E, "Examples of Minor Issues." This finding

affected the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (i.e., secondary containment) provide protection against a radiological release.

This finding was considered to have very low safety significance, and screened out as Green, using the NRC Significance Determination Process (SDP) Phase-1 Initial Screening for Reactor Inspection Findings for At-Power Situations because the finding only represented a degradation of the radiological barrier function provided by the SGTS. In addition, during the 4 month period that the condition existed, there were no events that required a SGTS actuation.

A contributing cause of this finding involved human performance errors, which are an aspect of the Human Performance cross-cutting area. The first human performance error was that maintenance technicians performed procedure steps out of sequence. The second human performance error was that operators did not identify operational testing, as required by procedures, to perform an adequate PMT. As a result, the component was returned to service while in a degraded condition, and was unable to perform its safety function.

Enforcement

Technical Specification 5.4.1 requires, in part, that written procedures shall be established and implemented as recommended in NRC Regulatory Guide (RG) 1.33 Appendix A. RG 1.33 Appendix A, section 9.a, "Procedures for Performing Maintenance," requires pre-planned maintenance activities be performed in accordance with written procedures for maintenance that can affect the performance of safety related equipment. Contrary to the above, on November 19, 2002, PPL did not implement written procedures NDAP-QA-0302 and MT-GE-030 to verify that SGTS damper PDDM-075-54B could perform its safety function after completion of maintenance activities. Specifically:

(1) NDAP-QA-0302, "System Status and Equipment Control," section 6.3.6, required, in part, that Operations Supervision (i.e., an SRO) identify and perform all operational testing needed to verify Technical Specification operability, prior to equipment restoration. However, no operational testing was identified or performed to verify that the SGTS damper could perform its safety function after the maintenance activity had been completed.

(2) Maintenance procedure MT-GE-030, "ITT Damper Hydramotor NH91/NH95 Overhaul," section 8.9.7, required PPL to verify that the SGTS damper operated properly, after maintenance activities were completed. However, PPL did not appropriately verify that the SGTS damper stroked properly after damper restoration.

Because this violation is of very low safety significance and PPL entered this finding into their corrective action program (CR 467829), this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000387,388/2003003-01)**

1R20 Unit 2 Refueling Outage Activities (71111.20)

.1 Control of Outage Activities

a. Inspection Scope

The inspectors observed selected maintenance, testing, and equipment restoration activities to verify whether component configuration management, test control, and post maintenance checks were performed in accordance with NRC requirements and PPL procedures. The inspectors reviewed unexpected plant conditions, emergent work, and system configuration control during testing and maintenance activities to evaluate whether the activities were performed in accordance with NRC requirements and PPL procedures.

The inspectors reviewed the ASME In-service inspection data and the surveillance test data, from the reactor coolant pressure boundary operational leakage test, to evaluate whether the test acceptance criteria were satisfied. In addition, the inspectors evaluated whether the activities were performed in accordance with NRC requirements and PPL approved procedures.

Specific Activities

- White substance identified on reactor vessel internals
- Fuel channel bowing evaluation
- Hydrostatic test, SE-200-002

Procedures and Documents

- PL-NF-02-007, revision 4, "Channel Management Action Plan"
- Control rod - fuel channel bowing, General Electric 10 CFR 50.21 notification (ENS # 39806)

b. Findings

No findings of significance were identified.

.2 Reactor Plant Startup Activities

a. Inspection Scope

The inspectors observed selected portions of the reactor startup from the control room to verify that Technical Specifications, license conditions, and administrative requirements were satisfied. The inspectors verified that reactor criticality occurred with the control rod positions within the allowed band predicted by the core design. The following activities and documents were reviewed or observed:

Plant Startup Activities

- Reactor operational mode change review by the Plant Operation Review Committee
- Startup preparations for mode change
- Primary and secondary containment integrity
- Reactor startup, control rod withdrawals and reactor criticality
- Reactor coolant system heat up activities
- Reactivity manipulations with the reactor recirculation system
- HPCI and RCIC surveillance testing at low reactor pressure
- HPCI surveillance test at 920 psig reactor pressure
- Thermal limits verification prior to exceeding 25% reactor power
- Main turbine over-speed testing and generator sync to grid, after Siemens Turbine replacement
- Feedwater heater level control

Procedures and Documents

- GO-200-010, "ECCS and Decay Heat Removal in Modes 4 and 5"
- GO-200-002, "Plant Startup, Heat up, and Power Operations"

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 1 SE-170-011, "Secondary Containment Drawdown and Inleakage 24-month Test"
- Unit 2 SR-255-004, "Scram Time Measurement of Control Rods," performed at 35% reactor power
- Unit 1 SO-152-002, "Quarterly RCIC Flow Verification"
- Unit Common SO-024-001, "A" EDG Monthly Surveillance Test," observed from the control room
- Unit 1 SO-152-004, "Quarterly HPCI Valve Exercise Test," observed from the control room

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 temporary power supplied to the safety parameter display system (SPDS), OT-290-001, "De-energizing SPDS UPS for Maintenance"
- Unit 2 temp instrumentation connected to main turbine electro-hydraulic control system for 2 months, per NDAP-QA-0510 trouble shooting plan (WO 469857), CRs 469838 and 481168

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

On June 3, 2003, the inspectors observed PPL's nuclear emergency response organization (NERO) during an announced emergency preparedness training exercise to evaluate PPL's NERO performance. The simulated emergency included the activation of the operations support center, technical support center, and emergency operations facility. The control room simulator was used for the exercise.

The inspectors observed the conduct of the exercise in the control room simulator. The inspectors assessed licenced operator and NERO adherence to emergency plan implementation procedures, and their response to simulated degraded plant conditions to identify weaknesses and deficiencies in classification, notification, and protective actions recommendations. The inspectors observed PPL's critique of the simulator control room participants when the exercise ended. In addition, on June 10, the inspectors observed PPL's facility critiques to evaluate PPL's identification of weaknesses and deficiencies. The inspectors compared PPL's identified findings against the inspectors' observations to determine whether PPL adequately identified failures. The inspectors' review included the following documents and procedures:

- Susquehanna Emergency Plan, revision 41
- EP-PS-126, "Control Room Communicator"

b. Findings

No findings of significance were identified.

3. SAFEGUARDS
Cornerstone: Physical Protection

3PP2 Access Control (71130.02)

a. Inspection Scope

The following activities were conducted during the inspection period to verify that PPL has effective site access controls, and equipment in place designed to detect and prevent the introduction of contraband (firearms, explosives, incendiary devices) into the protected area as measured against 10 CFR 73.55(d), the Physical Security Plan, and SSES Security Procedures.

Site access control activities were observed, including personnel and package processing through the search equipment during peak ingress periods on April 22 and 23, 2003. On April 23, 2003, observation of vehicle search activities was also conducted. On April 22, 2003, testing of all access control equipment, including metal detectors, explosive material detectors, and X-ray examination equipment, was observed.

b. Findings

No findings of significance were identified.

3PP3 Response to Contingency Events (71130.03)

a. Inspection Scope

The following activities were conducted to determine the effectiveness of PPL's Response to Contingency Events, as measured against the requirements of 10 CFR 73.55 and the SSES Safeguards Contingency Plan:

On April 23, 2003, a review of documentation associated with PPL's force-on-force exercise program was conducted. The review included documentation and critiques for exercises conducted since the first quarter of 2002, when the exercises were resumed post 9/11/01.

On April 22, 2003, performance testing of the SSES intrusion detection and alarm assessment systems was conducted. This testing was accomplished by one inspector who toured the entire perimeter and selected areas of potential vulnerability in the intrusion detection system. Concurrently, a second inspector observed the alarm assessment capabilities from the Central Alarm Station. During the walkdown of the intrusion detection system, thirty specific locations were selected for testing.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed PPL's performance indicator (PI) data to verify whether the PI data was accurate and complete. The inspectors compared the PI data against the guidance contained in NEI 99-02. The following NRC PIs and PPL documents were included in this review:

Procedures and Documents

- Nuclear Energy Institute (NEI) 99-02, revision 2, "Regulatory Assessment Performance Indicator Guideline"
- NDAP-QA-0737, "Regulatory Performance Assessment"
- LI-00-018, "Preparation of Performance Indicator Data, NRC Submittals, and Cornerstone Assessment Reports"
- Susquehanna Licensee Event Reports for 2002 and 2003
- EP-AD-022, revision 2, "Emergency Planning Performance Indicators"

Mitigating Systems Cornerstone PIs

- Safety System Functional Failure

For the period from April 2002 to March 2003, the inspectors examined the PI data, PPL PI data summary reports, and plant records, which included selected Technical Specification limiting condition for operation logs, licensee event reports, and condition reports.

Emergency Preparedness (EP) Cornerstone PIs

- Drill and Exercise Performance
- Emergency Response Organization Participation
- Alert Notification System Reliability

For the period from October 2002 to March 2003 (since the last EP PI verification inspection), the inspector assessed the PI data submitted to the NRC. The inspector reviewed PPL's process for identifying the data that is utilized to determine the values for these three PIs. Classification, notification and protective action opportunities were reviewed from licensed operator simulator sessions and site emergency response organization drills and exercises. Attendance records for drill and exercise participation was reviewed for completeness and accuracy. Test results of the alert notification system testing were reviewed.

Physical Protection Cornerstone PIs

- Fitness-for-Duty / Personnel Reliability Program
- Personnel Screening Program
- Protected Area Security Equipment

For the period from April 2002 to March 2003, the inspector reviewed PPL's programs for gathering, processing, evaluating, and submitting data for these 3 PIs. The review included PPL's tracking and trending reports, personnel interviews, safeguards events log, and security event reports during the review period.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine PI&R Review

a. Inspection Scope

The inspectors reviewed selected condition reports (CRs), as part of the routine baseline inspection documented in this report. The CRs were assessed to verify whether the full extend of the various issues were adequately identified, appropriate evaluations were performed, and reasonable corrective actions were identified. The inspectors evaluated the CRs against the requirements of NDAP-QA-0702, "Action Request and Condition Report Process," and 10 CFR 50, Appendix B.

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up (71153)

.1 (Closed) LER 05000388/2000005-01 Engineered Safety Feature Actuations due to Reactor Protection System Electrical Protection Assembly Breaker Trip

On December 5, 2000, the Unit 2 "B" reactor protection system (RPS) power was lost due to an electrical protection assembly (EPA) breaker trip. The failure resulted in a RPS "B" half scram and corresponding containment isolations. This event was initially reviewed in NRC Inspection Report 05000387,388/2001002, section 4OA3.1. PPL revised the apparent cause for the EPA failure, and provided additional corrective actions to prevent future occurrence. No new issues or additional findings were identified in this review. No violations of NRC requirements were identified. This LER is closed.

.2 (Closed) LER 05000388/2003002-00 Unusual Event Declared for a Contaminated Individual Transported Offsite

On March 24, 2003, an Unusual event was declared for a potentially contaminated individual being transported offsite to a local hospital. The individual was given medical treatment at the hospital and no contamination was found on the individual. No new issues or additional findings were identified in this review. No violations of NRC requirements were identified. This LER is closed.

4OA4 Cross Cutting Aspects of Findings

Cross-References to Human Performance Findings Documented Elsewhere

Section 1R19.2 describes a finding where a safety related damper was returned to service without verifying that the damper could perform its safety function. Four months later, PPL discovered that the damper could not perform its safety function. The damper's condition could have been reasonable have been identified, prior to its return to service, if maintenance personnel and operators had adequately implemented written procedures for a post maintenance test.

4OA6 Meetings

.1 Exit Meeting Summary

On July 3, 2003, the resident inspectors presented the inspection results to R. Anderson, Vice President - Nuclear Operations, and other members of your 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: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINT OF CONTACT

PPL Personnel

B. Shriver, Senior Vice President and Chief Nuclear Officer
R. Anderson, Vice President, Nuclear Operations
T. Kirwin, Manager, Maintenance
G. Ruppert, Manager, Operations
D. Glassic, Outage Manager
R. Ferentz, Manager, SSES Security
J. Grisewood, Supervisor, Emergency Planning
S. Kuhn, Supervisor, Maintenance
M. Peal, Supervisor, Operations
R. Lengel, Emergency Planning
Jim Wolfer, Chemistry
Bill Basta, Chemistry
John Lines, ISI
Dean Leimbach, ISI
Frank Wurst, Station Engineering
Jim Van Horn, Maintenance
Jeff Jeanguenat, ESW System Engineer
Rich Centenaro, Design Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000387,388/2003003-01	NCV	Standby Gas Treatment System Damper Failure (Section 1R19.2)

Closed

05000388/2000005-01	LER	Engineered Safety Feature Actuations due to Reactor Protection System Electrical Protection Assembly Breaker Trip (Section 4OA3.1)
05000387/2003002-00	LER	Unusual Event Declared for a Contaminated Individual Transported Offsite (Section 4OA3.2)

Discussed

None

LIST OF DOCUMENT REVIEWED
(Not Referenced in the Report)

Section 1R07: Heat Sink Performance

Procedures

- NDAP-QA-504, revision 4, "Heat Exchanger Program"
- M-1453, revision 4, "Heat Exchanger Tube Plugging"
- M-1548, revision 0, "Heat Exchanger Performance Monitoring Program"
- MT-GM-025, revision 11, "Heat Exchanger – Cleaning and Inspection"
- MT-216-002, revision 7, "RHR Heat Exchanger Cleaning, Inspection and Repair"
- NEIM-00-1156, revision 1, "Eddy Current Database Management"
- NEPM-QA-1159, revision 2, "Heat Exchanger Inspection"

Engineering Specifications

- H-1001, Revision 5, "Heat Exchanger/Condenser Tube Cleaning"
- H-1002, Revision 2, "Protective Epoxy Coating/Lining System for Condenser Tube Sheets, Water Boxes and Large Diameter Piping"
- H-1004, Revision 6, "Heat Exchanger/Condenser Inspection and Condition Assessment"
- H-1005, Revision 6, "Eddy Current Examination on Plant Heat Exchangers"

Calculations

- EC-024-0556, Revision 2, "Evaluate Impact of 97F Emergency Service Water Temperature on Diesel Generator A B C D & E Heat Exchanger"
- EC-049-1001, Revision 2, "Residual Heat Removal Heat Exchanger Performance at 7580 & 8000 GPM Residual Heat Removal Service Water Flow Rate"
- EC-CHEM-1018, Revision 2, "Justification for the Assurance of Adequate Heat Removal Capabilities Using the SSES Heat Exchanger Preventative Maintenance Program"
- EC-HXPM-1001, Revision 0, "Pilot Heat Exchanger Selection Evaluation Study Heat Exchanger Performance Monitoring Program"
- EC-HXPM-1003, Revision 0, "Thermal Performance Test Data Evaluation & Uncertainty Analysis for 2E205B RHR Heat Exchanger"
- EC-HXPM-1016, Revision 0, "Thermal Performance Test Data Evaluation & Uncertainty Analysis for 1E205A RHR Heat Exchanger"
- EC-HXPM-1024, Revision 0, "Thermal Performance Test Data Evaluation & Uncertainty Analysis for Initial E Jacket Water Cooler Performance Test Prior to Cleaning Tubes"
- EC-HXPM-1025, Revision 0, "Thermal Performance Test Data Evaluation & Uncertainty Analysis, E Jacket Water Cooler Performance After Cleaning Heat Exchanger Tubes"

Work Orders

- ERPM 358486, "M1181-52 Clean and Inspect the RHR SW Heat Exchanger 2E205B"

Condition Reports

- 306291, 306299, 341568, 345243, 350322, 352157, 355395, 364381, 404015, 404126, 405250, 405450, 406054, 406062, 423968, 423983, 425956

Miscellaneous

- PLA-3349, "Response to Generic Letter 89-13"
- PLA-3377, "Supplemental Response to Generic Letter 89-13"
- PLI-61650, "Status of Generic Letter 89-13"
- PLIS-45086, "Generic Letter 89-13 Flow Balancing Commitment"

Sections 3PP2 & 3PP3: Access Control and Response to Contingency Events

- Security Plan and Procedure Audit Number 2002-051
- Safeguards Event Log
- Susquehanna Steam Electric Station Physical Security Plan

LIST OF ACRONYMS

ADS	Automatic Depressurization System
CFR	Code of Federal Regulations
CR	Condition Report
CS	Control Structure
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPA	Electrical Protection Assembly
EPMC	Equipment Performance and Material Condition
ESW	Emergency Service Water
FSAR	[SSES] Final Safety Analysis Report
HPCI	High Pressure Coolant Injection
LER	Licensee Event Report
MCPR	Minimum Critical Power Ratio
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NERO	emergency response organization
NRC	Nuclear Regulatory Commission
PI	[NRC] Performance Indicator
PMT	Post Maintenance Test
PPL	PPL Susquehanna, LLC
QA	Quality Assurance
RCIC	Reactor Core Isolation Cooling
RG	[NRC] Regulatory Guide

RHR	Residual Heat Removal
RPS	Reactor Protection System
SDP	Significant Determination Process
SGTS	Standby Gas Treatment System
SPDS	Safety Parameter Display System
SSC	Structure, System, or Component
SSES	Susquehanna Steam Electric Station
SRV	Safety Relief Valve
TS	Technical Specifications
WO	Work Order