

October 31, 2006

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC INTEGRATED  
INSPECTION REPORT 05000387/2006004 AND 05000388/2006004

Dear Mr. M°Kinney:

On September 30, 2006, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on October 6, 2006, with you and other members of your staff.

The 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.

The report documents one NRC-identified finding of very low safety significance (Green). The finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Susquehanna Steam Electric Station.

B. McKinney

2

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

Sincerely,

**/RA/**

James M. Trapp, Chief  
Projects Branch 4  
Division of Reactor Projects

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

Enclosures: Inspection Report 05000387/2006004 and 05000388/2006004  
w/Attachment: Supplemental Information

cc w/encls:

R. A. Saccone, Vice President - Nuclear Operations  
T. L. Harpster, General Manager - Plant Support  
R. D. Pagodin, General Manager - Nuclear Engineering  
R. R. Sgarro, Manager - Nuclear Regulatory Affairs  
W. E. Morrissey, Supervisor, Nuclear Regulatory Affairs  
M. H. Crowthers, Supervising Engineer, Nuclear Regulatory Affairs  
S. Cook, Manager - Quality Assurance  
L. A. Ramos, Community Relations Manager, Susquehanna  
B. A. Snapp, Esquire, Associate General Counsel, PPL Services Corporation  
Supervisor - Document Control Services  
R. W. Osborne, Allegheny Electric Cooperative, Inc.  
Director - Bureau of Radiation Protection, PA Department of Environmental Protection  
Board of Supervisors, Salem Township  
J. Johnsrud, National Energy Committee

B. M<sup>c</sup>Kinney

3

Distribution w/encls: (via E-mail)

- S. Collins, RA
- M. Dapas, DRA
- J. Trapp, DRP
- C. Khan, DRP
- A. Blamey, DRP - SRI Susquehanna
- F. Jaxheimer, DRP - RI Susquehanna
- S. Farrell, DRP - Susquehanna OA
- B. Sosa, RI OEDO
- R. Laufer, NRR
- R. Guzman, PM, NRR
- T. Colburn, PM (backup), NRR
- Region I Docket Room (with concurrences)
- [ROPreports@nrc.gov](mailto:ROPreports@nrc.gov)

**SUNSI Review Complete:**     JMT     (Reviewer's Initials)

DOCUMENT NAME: C:\FileNet\ML063040665.wpd

After declaring this document "An Official Agency Record" it will be released to the Public.

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure  
"N" = No copy

OFFICE	RI/DRP		RI/DRP		RI/DPR	E
NAME	ABlamey/JMT FOR		Ckhan/JMT FOR		JTrapp/	
DATE	10/ 31 /06		10/ 31 /06		10/ 31 /06	

OFFICIAL RECORD COPY

**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos.: 50-387, 50-388

License Nos.: NPF-14, NPF-22

Report No.: 05000387/20060004 and 05000388/2006004

Licensee: PPL Susquehanna, LLC (PPL)

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: Berwick, Pennsylvania

Dates: July 1, 2006 through September 30, 2006

Inspectors: A. Blamey, Senior Resident Inspector  
F. Jaxheimer, Resident Inspector  
J. Furia, Senior Health Physicist  
C. Bickett, Resident Inspector

Approved by: James M. Trapp, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	iii
REPORT DETAILS .....	2
REACTOR SAFETY .....	2
1R01 Adverse Weather Protection .....	2
1R04 Equipment Alignment .....	3
1R05 Fire Protection .....	3
1R11 Licensed Operator Requalification Program .....	4
1R12 Maintenance Effectiveness .....	4
1R13 Maintenance Risk Assessments and Emergent Work Control .....	5
1R15 Operability Evaluations .....	7
1R19 Post-Maintenance Testing .....	8
1R22 Surveillance Testing .....	8
1R23 Temporary Plant Modifications .....	9
RADIATION SAFETY .....	9
2OS1 Access Control to Radiologically Significant Areas .....	9
2OS2 ALARA Planning and Controls .....	10
2OS3 Radiation Monitoring Instrumentation and Protective Equipment .....	11
OTHER ACTIVITIES .....	11
4OA1 Performance Indicator Verification .....	11
4OA2 Identification and Resolution of Problems .....	12
4OA3 Event Follow-up .....	13
4OA6 Meetings, Including Exit .....	15
ATTACHMENT: SUPPLEMENTAL INFORMATION .....	15
KEY POINTS OF CONTACT .....	A-1
LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED .....	A-1
LIST OF DOCUMENTS REVIEWED .....	A-1
LIST OF ACRONYMS .....	A-3

## SUMMARY OF FINDINGS

IR 05000387/2006-004, 05000388/2006-004; 07/01/2006 - 09/30/2006; Susquehanna Steam Electric Station, Units 1 and 2; Maintenance Risk Assessments and Emergent Work Control.

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

### A. NRC Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50.65 (a)(4), for an inadequate risk assessment. PPL did not correctly assess the risk associated with planned maintenance activities on the 'A' emergency service water pump and the diesel fire pump on August 25, 2006. PPL entered this deficiency into their corrective action program and revised the risk assessment to correctly assess plant risk.

The finding is greater than minor because it was similar to Example 7.e in IMC 0612, Appendix E, "Examples of Minor Issues," and because PPL underestimated the cumulative increase in core damage probability for ongoing planned maintenance which when correctly assessed placed Unit 2 into a higher risk category. The finding was determined to be of very low safety significance (Green) using Appendix K of Inspection Manual Chapter 0609, "Maintenance Risk Assessment and Risk Management Significance Determination Process," using Flowchart 1, because the incremental core damage probability deficit was determined to be less than 1.0 E-6 and the incremental large early release probability deficit was determined to be less than 1.0 E-7. The finding has a cross-cutting aspect in the area of human performance because PPL's planned work activities did not effectively incorporate risk insights. (Section 1R13)

### B. Licensee-Identified Violations.

None.

Enclosure

## REPORT DETAILS

### Summary of Plant Status

Susquehanna Steam Electric Station (SSES) Unit 1 started the inspection period with a power reduction to approximately 20 percent rated thermal power (RTP) to replace a main turbine electrohydraulic control system card. Unit 1 returned to 100 percent RTP on July 2, 2006 and remained at 100 percent RTP for the remainder of the inspection period with the exception of two weekend power reductions to 75 percent RTP, in September to perform a control rod sequence exchange, turbine valve testing and control rod maintenance.

Unit 2 began the inspection period with a power ascension from 70 percent RTP to 100 percent RTP following a control rod sequence exchange on July 1, 2006. Unit 2 remained at 100 percent RTP power from July 2, 2006, until power was reduced to 75 percent RTP on July 16, 2006 to support scheduled transmission and distribution work. Unit 2 returned to 100 percent RTP on July 17, 2006 and remained at full RTP until a downpower for control rod sequence exchange on August 26, 2006. This power reduction was extended, due to a stuck control rod. Reactor power returned to 100 percent RTP on August 29, 2006. Unit 2 ended the inspection period with a reactor shutdown on September 29, 2006 for a scheduled outage to perform fuel channel replacement and a fuel shuffle to address the ongoing control cell friction issue.

### **1. REACTOR SAFETY**

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01- 1 Sample)

##### a. Inspection Scope

During the week of July 17, 2006, the inspectors reviewed PPL's preparations for extreme hot weather. Plant walkdowns for selected structures, systems and components (SSCs) were performed to determine the adequacy of PPL's weather protection activities. The inspectors also reviewed and evaluated plant conditions during extreme hot weather which occurred the week of July 31, 2006. Inspectors reviewed related considerations in PPL's Maintenance Rule (MR) station risk assessment and maintenance work scheduling. The readiness of the following systems was reviewed.

- Emergency service water (ESW), residual heat removal service water (RHRSW), and the ultimate heat sink with outside air temperatures greater than 95°F.

##### b. Findings

No findings of significance were identified.

Enclosure

1R04 Equipment Alignment (71111.04Q - 3 Samples).1 Partial Walkdowna. Inspection Scope

The inspectors performed partial 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 (OOS). The inspectors reviewed selected valve positions, electrical power availability, and the general condition of major system components. The equipment configuration was then compared to plant drawings, operating procedures and design documents to verify the operability of the systems. The walkdowns included the following systems:

- Units 1 and 2, compressed instrument gas systems including 2 hour air bottles on Unit 1
- Units 1 and 2, EWS to emergency diesel generators (EDGs) and cross connects between 'A' and 'B' flow loops
- Unit 2 Division I residual heat removal (RHR)

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05 - 10 Samples).1 Fire Protection - Toursa. 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 inspected areas included:

- Common, 'E' - EDG Building, fire zone 0-41E.
- Common, Security Control Center, fire zone 0-83, FP-013-360
- Common, Low Level Radwaste Building - offsite responder fire drill
- Common, 'D' - EDG Building, fire zone 0-41D
- Units 1 and 2, Battery and Battery Charger Rooms, fire zones 0-28A, B, F, K, & L
- Unit 1 Switchgear Rooms, fire zones 1-4C, 1-4D (reactor building elevation 719') FP-113-115



- Unit 1 reactor recirculation motor generator set area, fire zone 1-35C, FP-113-234
- Unit 1 turbine building basement, fire zone 1-31F
- Unit 2 Switchgear Rooms fire zone 2-4C, 2-4D (reactor building elevation 719') FP-213-250
- Unit 2 Reactor Building elevation 683 foot fire zone 2-3B-N,S; FP-213-245, 246

b. Findings

No findings of significance were identified.

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

.1 Resident Inspector Quarterly Review

a. Inspection Scope

On September 6, 2006, the inspectors observed licensed operator performance in the simulator during operator requalification training. The inspectors compared the operators' actions to Technical Specification requirements, emergency plan procedures, and emergency operating procedures. The inspectors also evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. The following training scenario was observed:

- Licensed operator requalification simulator exam scenarios on September 6, 2006, which included the failure of an automatic scram and other equipment malfunctions.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 1 Sample)

a. Inspection Scope

The inspectors evaluated PPL's work practices and follow-up corrective actions for selected 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:

- Units 1 and 2 electrolytic capacitor components following MR functional failure and missed preventive maintenance (PMs), Condition Report 753990

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 6 Samples)

a. Inspection Scope

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

The inspectors reviewed scheduled and emergent work activities with licensed operators and work-coordination personnel to verify whether risk management action threshold levels were correctly identified. In addition, the inspectors compared the assessed risk configuration to the actual plant conditions and any in-progress evolutions or external events to evaluate whether the assessment was accurate, complete, and appropriate for the emergent work activities. The inspectors reviewed PPLs on-line risk monitor "Equipment Out of Service" (EOOS) inputs and results to gain insights into the risk associated with these plant configurations when appropriate. 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:

- Units 1 and 2, 'D' EDG 80 pound air header regulator failure, CR 794122
- Units 1 and 2, 'E' EDG turbocharger overspeed engine trip and maintenance outage, CR 794697
- Units 1 and 2, Reschedule of PM and surveillances during grid warnings and hot weather period, July 31 - August 3, 2006
- Units 1 and 2, Reschedule of station backout diesel PMs and 'C' EDG modification due to emergent work on 'A' EDG (ESW leak and slow start), CR 804028 and 804034
- Unit 1 and 2, ESW check valve failure and repair, CR 806572
- Unit 2, refueling floor wall exhaust radiation monitor failure, CR 807670 and 808572

b. Findings

Introduction. The inspectors identified a Green NCV of 10CFR 50.65(a)(4) because PPL performed an inadequate risk assessment for planned maintenance activities on the 'A' ESW pump and station diesel fire pump, which resulted in underestimating the risk associated with performing the associated maintenance activities on August 25, 2006.

Description. On August 25, at 4:09 a.m., PPL removed the 'A' ESW pump from service for scheduled maintenance. Approximately two hours later, the inspectors observed that the station diesel fire pump remained out-of-service. Earlier in the week, when inspecting the rescheduling of station backout diesel PMs due to emergent work, the inspectors observed that the diesel fire pump was not included in the EOOS risk model calculation inputs after August 24, 2006. The Inspectors questioned if the risk calculation was updated and correct for the ongoing maintenance activities. PPL recalculated the risk for the ongoing maintenance activities in accordance with station procedure PSP-26, "ORAM-EOOS Program," and logged the results as being in the Green Risk category at 7:50 a.m.. When a peer check of the corrected calculation was performed several hours later it was determined that the calculation results were misinterpreted and that the actual results placed Unit 2 in the Yellow Risk category. The correct results were logged, reported to the control room and the inspectors by 12:40 p.m. on August 25, 2006.

The inspectors noted that the risk inputs programmed into EOOS were recalculated each day based on a dynamic schedule which had changed significantly for the work week. Inspectors observed that the EOOS calculations were not properly updated for the diesel fire pump outage length. Station procedure, NDAP-QA-1902, "Maintenance Rule Risk Assessment and Management Program," requires (1) a risk assessment of scheduled maintenance be performed before maintenance is begun and (2) Risk Management Actions (RMAs) be considered for plant equipment configurations which result in plant risk exceeding risk management thresholds. RMAs were not properly considered or implemented for the maintenance activities on August 25, 2006, since the evaluation of plant risk was incorrect. PPL did not restore the diesel fire pump as scheduled due to lack of resources and then removed the 'A' ESW pump from service without a current risk evaluation. The 'A' ESW pump was restored to functional status approximately 8 hours later. PPL initiated CR 805396 to document and correct this Maintenance Rule performance deficiency.

Analysis. The inspectors determined that not performing an adequate risk assessment prior to conducting online maintenance on the 'A' ESW pump while the diesel fire pump was in a system maintenance outage on August 25, 2006 constituted a performance deficiency and a finding. The finding, which was associated with the Mitigating Systems cornerstone, was more than minor because it was similar to Example 7.e in IMC 0612, Appendix E, "Examples of Minor Issues," and because PPL underestimated the cumulative increase in core damage probability for ongoing planned maintenance which, when correctly assessed, placed Unit 2 into a higher risk category. The finding was evaluated in accordance with Appendix K of Inspection Manual Chapter 0609,

"Maintenance Risk Assessment and Risk Management Significance Determination Process," and determined to be of very low safety significance (Green), using Flowchart 1. This determination was based on the incremental core damage probability (ICDP) of 1E-09 and the incremental large early release probability (ILERP) of 1.3E-10 for the 8 hour duration of the maintenance configuration ('A' ESW pump and the diesel fire pump both out of service) which are significantly less than 1E-06 (ICDP) and 1E-07 (ILERP).

The finding has a cross-cutting aspect in the area of human performance because PPL's planned work activities did not effectively incorporate risk insights.

Enforcement. 10 CFR 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires, in part, that before performing maintenance activities (including, but not limited to surveillances, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, PPL did not perform an adequate risk assessment for maintenance on August 25, 2006. Specifically, PPL did not assess the total increase in core damage probability due to the unavailability of the 'A' ESW pump and the diesel fire pump. Because the finding was of very low safety significance and has been entered into the corrective action program (CR # 805396), this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000388/2006004-01, Inadequate Risk Assessment.

1R15 Operability Evaluations (71111.15 - 6 Samples)

a. Inspection Scope

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

- Units 1 and 2, 'C' EDG fuel oil leak on July 3 and July 5, CR 749560
- Units 1 and 2, 'B' EDG air manifold crack on 2L cylinder, CR 798523
- Units 1 and 2, Static pressure in recirculation plenum, CR 801261
- Units 1 and 2, Low sulfur diesel fuel oil - EDGs, CR 809691
- Units 1 and 2, "A" loop ESW pressurized to 70 psig during "B" loop surveillance, SO-054-B03, CR 810518
- Unit 1, 1 'C' 4KV bus breaker 09 truck operated cell (TOC) switch failure Engineering Work Request (EWR) 811738 and Action Request (AR) 811196

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 6 Samples)

a. Inspection Scope

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

- Units 1 and 2, 'D' EDG governor modification and overhaul, TP-024-148
- Units 1 and 2, repair the 'E' EDG transfer switch OATS556, PCWO 749616
- Unit 1, replacement of control rod drive flow controller and instrument power supply, plant component work order (PCWO) 7929750
- Unit 1, replace TOC switch in the 'C' 4Kv bus cubical 09, PCWO 811203
- Unit 2, dynamic motor operated valve (MOV) testing following HV251F027B stem nut replacement, PCWO 778694
- Unit 2, dynamic MOV testing following HV251F047A, PCWO 778696

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 5 Samples)

a. Inspection Scope

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

- Units 1 and 2, 'B' emergency diesel generator loading as compared to the FSAR design loads on July 31, 2006
- Unit 1, revision to drywell floor drain inleakage calculation SO-100-006
- Unit 2, reactor core isolation cooling pump valve and flow surveillance, on July 26, 2006

- Unit 2, semi-annual calibration of average power range monitor (APRM) channel B, August 9, 2006, SI-278-319B
- Unit 2, SI-278-333D2, oscillation power range monitor (OPRM) D2 calibration on August 9, 2006

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

a. Inspection Scope

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

- Add support to reactor recirculation lube oil cooler lines, EC 8024-5

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational Radiation Safety**

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 8 Samples)

a. Inspection Scope

The inspectors reviewed all Susquehanna performance indicators (PIs) for the Occupational Exposure Cornerstone for followup from January 1 through August 17, 2006.

The inspectors reviewed radiation work permits for airborne radioactivity areas with the potential for individual worker internal exposures of >50 mrem committed effective dose equivalent [CEDE] (20 derived air concentration-hrs). The inspectors reviewed and assessed the adequacy of PPL's internal dose assessment for any actual internal exposure greater than 50 mrem CEDE. No internal exposures of this magnitude were reported by PPL during the period from January 1 through August 17, 2006.

The inspectors verified barrier integrity and engineering control performance (e.g., high efficiency particulate air ventilation system operation). The inspectors examined PPL's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools. For high radiation work areas with significant dose rate gradients (factor of 5 or more), the inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel, and verified the adequacy of PPL controls.

The inspectors discussed, with the radiation protection manager, high dose rate-high radiation area, and very high radiation area (VHRA) controls and procedures. The inspectors verified that any changes to PPL procedures did not substantially reduce the effectiveness and level of worker protection.

The inspectors discussed, with first-line health physics (HP) supervisors, the controls in place for special areas that have the potential to become VHRA during certain plant operations. The inspectors verified that these plant operations require communication beforehand with the HP group, so as to allow corresponding timely actions to properly post and control the radiation hazards.

The inspectors conducted direct observation of activities taking place in the fuel pool area involving the processing of irradiated components in preparation for shipment for disposal. Additionally, the inspectors observed the removal and repair of the advanced crusher shear from the fuel pool. The activities observed involved hot particle control, significant dose rate gradients, locked high and potentially VHRA controls, and as low as is reasonably achievable (ALARA) planning.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed PPL's method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work are encountered.

Utilizing PPL records, the inspectors reviewed the historical trends and current status of tracked plant source terms. The inspectors verified that PPL was making allowances or developing contingency plans for expected changes in the source term due to changes

in plant fuel performance issues or changes in plant primary chemistry. The inspectors also attended the August 14, 2006 meeting of the station ALARA committee.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (7112103 - 1 Sample)

a. Inspection Scope

The inspectors reviewed the types of portable radiation detection instrumentation used for job coverage of high radiation area work, other temporary area radiation monitors currently used in the plant, and continuous air monitors associated with jobs with the potential for workers to receive 50 mrem CEDE.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151 - 2 Samples)

a. Inspection Scope

Cornerstone: Occupational Radiation Safety

- Occupational Exposure Control Effectiveness

The inspectors reviewed all Susquehanna PIs for the Occupational Exposure Cornerstone for follow-up. The inspectors reviewed a listing of PPL action reports for the period from January 1 through August 17, 2006 for issues related to the occupational radiation safety performance indicator, which measures non-conformances with high radiation areas greater than 1R/hr and unplanned personnel exposures greater than 100 mrem total effective dose equivalent (TEDE), 5 rem skin dose equivalent (SDE), 1.5 rem lens dose equivalent (LDE), or 100 mrem to the unborn child.

The inspectors determined if any of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at 1 meter. If so, the inspectors determined what barriers had failed and if there were any barriers left to prevent personnel access. For unintended exposures >100 mrem TEDE (or >5 rem SDE or >1.5 rem LDE), the inspector determined if there were any overexposures or substantial potential for overexposure. The inspectors determined that PPL had no occurrences during the period specified which met these criteria.



Cornerstone: Public Radiation Safety

- RETS/ODCM Radiological Effluents Occurrence

The inspectors reviewed a listing of PPL action reports for the period from January 1 through August 17, 2006 for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences per site that exceed 1.5 mrem/qtr whole body or 5 mrem/qtr organ dose for liquid effluents; or 5 mrads/qtr gamma air dose, 10 mrads/qtr beta air dose; or 7.5 mrems/qtr organ doses from I-131, I-133, H-3 and particulates for gaseous effluents. The inspectors determined that PPL had no occurrences during the period specified which met these criteria.

b. Findings

No findings of significance were identified.

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

.1 Review of Items Entered into the Corrective Action Program

As required by Inspection Procedure (IP) 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed screening of all items entered into PPL's corrective action program. This was accomplished by reviewing the description of each new action request / condition report and attending daily management meetings.

.2 Annual Sample: Review of Operator Work-Arounds

a. Inspection Scope

The inspectors performed walkdowns in the control room and remote shutdown panels, as well as reviewed action requests to identify deficient conditions that could challenge the operator's ability to correctly operate plant equipment. The "Risk Significant Operator Actions" list was also reviewed to determine if any of the deficient conditions impacted highly important and time critical actions. The deficient conditions were compared to off-normal and emergency operating procedures to determine if the deficient condition would prevent the proper operation of the equipment and / or implementation of the procedures. The inspectors also assessed the operational impact by evaluating if the condition would (1) change a longstanding operating practice, (2) require operation in a manner dissimilar from similar components or systems, (3) impair access to required indications, (4) increase required operator actions, and (5) require operation of equipment under conditions it was not designed to operate. In addition, the inspectors assessed the complexity of the task to determine if the operator's training was adequate to correctly operate the deficient equipment. Finally, the inspectors evaluated the cumulative effects of the deficient conditions on the ability of the operators

Enclosure

to respond in a correct and timely manner. Typical examples of deficient conditions reviewed included, but was not limited to:

- Unit 1, 'A' control rod drive flow control valve oscillating, AR 768744
- Unit 1, 'C' condensate pump motor thrust bearing temperature point is spiking, AR 402320
- Unit 1 refueling water pump discharge pressure is reading low in the control room, AR 756989
- Unit 1, 'K' safety relief valve discharge pipe temperature is greater than 200°F, AR 771547
- Unit 2, service water isolation valve to the 'B' turbine building closed cooling water heat exchanger did not fully close, AR 791428
- Unit 2, 'A' reactor feedwater pump unable to respond to a demand signal, Operational Decision Making (ODM) 810625
- Unit 2, core flow restrictions, ODM 659894
- Unit 2, feedwater heater 'B' string, ODM 808801

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up (71153 - 2 Samples)

.1 Control Rod 42-51 Stuck, August 27, 2006

a. Inspection Scope

On August 27, 2006, Unit 2 was at 75 percent RTP to perform control rod testing. Control rod 42-51 was being manually inserted from the fully withdrawn position (48) to the fully inserted position (00) when it stopped at position 46. PPL increased drive water pressure in accordance with station procedure ON-255-001, "Control Rod Problems." After raising drive water pressure the control rod was inserted to position 36 before it stopped. The control rod could not be inserted past position 36 using existing station procedures and PPL declared the control rod inoperable at position 36. The control rod was hydraulically isolated at 6:01 a.m., in accordance with TS 3.1.3 Control Rod Operability. Technical Specifications also require PPL to verify shutdown margin was maintained within 72 hours of disabling a control rod. At 3:55 p.m., PPL determined that the Unit 2 Technical Specification 3.1.1 shutdown margin was not met, due to control rod 42-51 being hydraulically isolated at position 36. Shutdown Margin was reestablished by fully inserting the four control rods around control rod 42-51 at 4:51 p.m.. Control rod 42-51 was fully inserted by increasing the drive water flow to the control rod at 6:22 p.m..

The inspectors responded to the site to monitor activities associated with the stuck control rod on August 27, 2006. The inspectors assessed plant conditions, the status of the other Unit 2 control rods, PPL's immediate corrective actions and the action plan to fully insert control rod 42-51. The inspectors also verified that Unit 2 met the technical

specification requirements for control rod operability, shutdown margin and that the reactor protection system was still operable and would have been able to rapidly shutdown Unit 2 if required. The inspectors discussed the results of the troubleshooting with the control rod drive system engineers, reactor engineers, and plant operating staff. The results of the troubleshooting indicated that the control rod had degraded drive seals, coupled with control cell friction, which prevented the drive from being inserted until the drive water flow was increased to compensate for the degraded seals.

PPL's initial corrective actions included modifying station procedure TP-055-005, "Leaky Hydraulic Control Unit Valve Troubleshooting Testing," which increased the drive water flow to the seals and allowed the control rod to be fully inserted. However, on September 13, 2006, during preparation for additional control rod testing on Unit 1, the inspectors interviewed engineers to determine what actions were taken to prevent recurrence during the control rod drive testing scheduled for September 16, 2006. The inspectors determined that no changes had been made to allow increasing drive water flow during testing, to compensate for degraded seals and prevent recurrence. After the discussion, and before Unit 1 control rod testing, PPL changed ODM 676754 to allow increasing drive water flow to fully insert control rods with significantly degraded seals. PPL's has since made permanent changes to station procedure ON-255-001, "Control Rod Problems," which allows increasing drive water flow to compensate for degraded seals.

b. Findings

No findings of significance were identified.

.2 (Closed) LER 05000388/2006-001-00 Technical Specifications Not Met for Inoperable ADS Pressure Switches

On January 25, 2006, PPL investigated the potential for interaction between an installed scaffold and tubing that supplied two automatic depressurization system (ADS) pressure switches. These switches provide an ADS initiation permissive signal when the 2D RHR pump is running. PPL's analysis concluded that scaffolding movement during a dynamic event could have challenged the function of the ADS pressure switches. As a result, they declared the pressure switches inoperable from the time of scaffold installation on February 1, 2005 to scaffold removal on January 27, 2006. This exceeds Technical Specification 3.3.5.1 allowable completion times for inoperable emergency core cooling system (ECCS) instrumentation. The scaffold installation did not compromise the function of ADS since the pump running permissive for ADS initiation has numerous alternative sources. A finding regarding this issue is documented in NRC Inspection Report 05000387, 388/2006-006

PPL completed a site-wide inspection of accessible scaffolds and did not identify any additional adverse impacts to other safety-related equipment. PPL also revised their scaffolding control program to incorporate lessons learned from their root cause evaluation. The inspectors identified no additional findings in their review. PPL

documented this issue and associated corrective actions in condition reports 745248 and 745462. This LER is closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 6, 2006, the resident inspectors presented the inspection results to Mr. B. McKinney, Senior Vice President, and Chief Nuclear Officer, and other members of his staff, who acknowledged the findings. Susquehanna management stated that none of the information reviewed by the inspectors was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure



**Section 1R05: Fire Protection**

FP-013-198, "Pre-Fire Plan: Diesel Generator Bay "D", Fire Zone 0-41D," Revision 4

**Section 1R12: Maintenance Effectiveness**

Maintenance Rule Expert Panel Meeting Minutes, Meeting # 2006-0420

**Section 2OS: Occupational Radiation Safety**

Condition Reports:

733098; 732539; 750309; 755414; 755362; 756718; 756780; 756786; 756788; 756791;  
757080; 757729; 757709; 757605; 758330; 758999; 759216; 751697; 755883; 755600;  
755780; 756406; 756517; 756628; 756635; 756690; 756690; 756718; 756759; 756780;  
756786; 756788; 756791; 757080; 757085; 757213; 757247; 757250; 757251; 757605;  
757613; 757673; 757709; 757729; 757775; 757777; 758054; 758093; 758500; 758828;  
758999; 759116; 759214; 759216; 759230; 759303; 759628; 759686; 759753; 759806;  
760395; 760549; 760948; 761254; 761319; 761662; 761846; 762692; 762950; 763150;  
763767; 763857; 764171; 764366; 764685; 764872; 765305; 765409; 765869; 766279;  
766600; 767275; 767952; 768199; 768352; 768461; 768724; 769166; 769179; 769248;  
769836; 769876; 769869; 770300; 771209; 771218; 771471; 771549; 771781; 772657;  
772991; 773035; 773147; 773236; 774740; 775932; 775990; 776014; 776328; 776637;  
776901; 778177; 778191; 778690; 778842; 780782; 784409; 784456; 784675; 799879;  
799316; 797595; 791044; 800148; 768213; 774539; 745180; 732189; 732572

"Removal of Advanced Crusher Shear (AC/S) from Cask Storage Pit (CSP) Work Plan"  
PPL Susquehanna, LLC., "Unit 1 14<sup>th</sup> Refuel and Inspection Outage Radiological Performance  
Report," July 12, 2006

Collective Radiation Exposure Reduction Plan, updated August 14, 2006

NDAP-QA-0626, Rev 7, Radiologically Controlled Area Access and Radiation Work Permit  
(RWP) System

HP-240, Rev 0, Main Steam for HP Techs

TM-OP-083-ST, Rev 2, Systems Training: Main Steam

Station ALARA Committee Meeting Agenda, August 14, 2006

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

AR 761286, "CRD flow Control Valve Oscillating Excessively"

CRD system journal number 1423, AR 761286

Control Room Deficiency Tags, Unit 1, Unit 2 and Common, dated 9/1/06

Annunciator Issues database Unit 1, Unit 2, and Common, dated 9/8/06

Operator Monthly Performance Indicator, Operator Aggregate Impact Index dated 8/17/06

Operator Workaround List, dated 8/28/06

OI-AD-096, "Operator Work-Around / Challenges," Rev. 5

ON-000-001, "Security Event," Rev. 13  
 EO-000-113, "Level / Power Control," Rev. 2

**Section 4OA3: Event Followup**

AR 756711, "Walkdown, Inspect, and Tag All U-1 Long Term Scaffolds Prior to Startup"  
 CR 745248, "Scaffolding at the 2D RHR Pump (2P202D) Could Impact RHR Operation"  
 CR 745462, "Apparent Trend - Recent Incidents Identifying Discrepancies With Scaffold"  
 Root Cause Analysis for CR 745248 and CR 745462

**LIST OF ACRONYMS**

ADAMS	Agencywide Document and Access Management System
ADS	Automatic Depressurization System
ALARA	As Low As Is Reasonably Achievable
APRM	Average Power Range Monitor
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOOS	Equipment Out of Service
ESW	Emergency Service Water
EWR	Engineering Work Request
°F	degrees Fahrenheit
FSAR	Final Safety Analysis Report
HP	Health Physics
ICDF	Incremental Core Damage Frequency
ILERP	Incremental Large Early Release Probability
IMC	Inspection Manual Chapter
IP	Inspection Procedure
LDE	Lens Dose Equivalent
LER	Licensee Event Report
MOV	Motor-Operated Valve
MR	Maintenance Rule
NCV	Non-cited Violation
NDAP	Nuclear Department Administrative Procedure
NRC	Nuclear Regulatory Commission
ODM	Operational Decision Making
OOS	Out-Of-Service
OPRM	Oscillation Power Range Monitor
PARS	Publically Available Records
PCWO	Plant Component Work Orders
PI	[NRC] Performance Indicator
PM	Preventive Maintenance

PPL	PPL Susquehanna, LLC
RETS/ODCM	Radiological Effluents Technical Specifications/Off-Site Dose Calculation Manual
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RMA	Risk Management Actions
RTP	Rated Thermal Power
SDE	Skin Dose Equivalent
SDP	Significant Determination Process
SSC	Structures, Systems, and Components
SSES	Susquehanna Steam Electric Station
TEDE	Total Effective Dose Equivalent
TOC	Truck Operated Cell
TS	Technical Specifications
VHRA	Very High Radiation Area