

January 28, 2005

Mr. Bryce L. Shriver  
President, PPL Generation, LLC and  
Chief Nuclear Officer  
PPL Generation, LLC  
2 North Ninth Street  
Allentown, PA 18101

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC INTEGRATED  
INSPECTION REPORT 05000387/2004005 AND 05000388/2004005

Dear Mr. Shriver:

On December 31, 2004, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed integrated inspection report and Notice of Violation presents the results of that inspection, which was discussed with Mr. R. Saccone, Vice President - Nuclear Operations and other members of your staff on January 13, 2005.

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

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's Web site at [www.nrc.gov](http://www.nrc.gov); select **What We Do, Enforcement**, then **Enforcement Policy**. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because PPL did not restore compliance within a reasonable time by performing a 10 CFR 50.59 evaluation or controlling the Unit 1 railroad bay as part of secondary containment during subsequent receipt of equipment. Thus, the violation does not qualify for issuance of an NCV under Section VI the NRC Enforcement Policy.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

This report also documents three findings of very low safety significance (Green). All three of the findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because the issues were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), consistent with

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Section VI.A of the NRC Enforcement Policy. Additionally, one licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. If you contest the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Susquehanna Steam Electric Station.

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

Enclosures:

1. Notice of Violation
2. Inspection Report 05000387/2004005 and 05000388/2004005  
w/Attachment: Supplemental Information

cc w/encls:

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R. A. Saccone, Vice President - Nuclear Operations for PPL Susquehanna LLC  
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## NOTICE OF VIOLATION

PPL Susquehanna, LLC  
Susquehanna Steam Electric Station

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

During an NRC inspection conducted between October 1 and December 31, 2004, for which an exit meeting was held on January 13, 2005, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

Paragraph (c)(1) of 10 CFR 50.59 states, in part, that a licensee may make changes in the facility and procedures as described in the Final Safety Analysis Report (FSAR) and conduct tests or experiments not described in the FSAR without obtaining a license amendment only if the change, test or experiment does not meet any of the criteria in paragraph (c)(2) of this section.

Paragraph (d)(1) of 10 CFR 50.59 states, in part, that the licensee shall maintain records of changes to the facility, procedures, conduct of tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for determination that the change does not require a license amendment pursuant to paragraph (c)(2) of this section.

Contrary to the above, PPL made a change to the facility, ie the method for performing or controlling a function, different from that described in the FSAR and did not perform and maintain records of a written evaluation which provided the basis for determination that the change does not require a license amendment. Specifically, on December 16, 20, 23, 2004, and on January 4, 2005, PPL changed the ventilation of the Unit 1 railroad bay from an area within the secondary containment, as described in the FSAR, to an area outside the secondary containment without a written evaluation pursuant to 10 CFR 50.59.

This is a Severity Level IV violation.

Pursuant to the provisions of 10 CFR 2.201, PPL is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region I, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other

action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 28th day of January 2005

**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos.: 50-387, 50-388

License Nos.: NPF-14, NPF-22

Report No.: 05000387/2004005, 05000388/2004005

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station

Location: 769 Salem Boulevard  
Berwick, PA 18603

Dates: October 1, 2004 through December 31, 2004

Inspectors: A. Blamey, Senior Resident Inspector  
F. Jaxheimer, Resident Inspector  
J. Furia, Sr. Health Physicist  
D. Silk, Sr. Emergency Preparedness Inspector  
J. Lilliendahl, Reactor Engineer  
N. McNamara, Emergency Preparedness Inspector  
S. Iyer, Reactor Engineer  
G. Meyer, Senior Reactor Inspector

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

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## SUMMARY OF FINDINGS

IR 05000387/2004005, 05000388/2004005; 10/01/2004 - 12/31/2004; Susquehanna Steam Electric Station, Units 1 and 2; Equipment Alignments, Operability Evaluations, Access Control to Radiologically Significant Areas, and Radioactive Material Processing and Shipping.

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

### A. NRC Identified Findings

Cornerstone: Barrier Integrity

- C Severity Level VI Violation. The inspectors identified a Severity Level IV violation of 10 CFR 50.59 requirements for the failure to evaluate a change in plant system configuration that was known to be inconsistent with accident analysis and the final safety analysis report (FSAR) description. On December 16, 20, 23 2004, and on January 4, 2005, PPL aligned the ventilation of the Unit 1 Reactor Building railroad bay to be outside of secondary containment which was inconsistent with the assumptions of a previously analyzed accident described in FSAR Chapter 15.6.2. PPL did not perform an evaluation in accordance with the requirements of 10 CFR 50.59 to determine if the change required a license amendment prior to implementation of this change in plant configuration.

This finding was addressed using traditional enforcement since it potentially impacts or impedes the regulatory process in that a required 10 CFR 50.59 evaluation was not performed and documented. A SDP Phase-1 screening was performed and determined that the condition resulting from the violation of 10CFR 50.59 was of very low safety significance because the finding only represents a degradation of the radiological barrier function provided by secondary containment and the standby gas treatment system. This is a Severity Level IV Violation of NRC requirements in accordance with Section VI.A of the NRC Enforcement Policy (Supplement I - Reactor Operations; Example D.5). This violation is being cited in a Notice of Violation under Section VI of the NRC Enforcement Policy since PPL did not restore compliance within a reasonable time after the violation was identified nor did they enter the violation into a corrective action program to address recurrence. (Section 1R15)

- C Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design control," because PPL did not have adequate measures established to control the alignment of the central railroad bay ventilation to the secondary containment as described in the accident analysis in the FSAR. This resulted in several reactor recirculation system and residual heat removal system

## Summary of Findings (cont'd)

instrument lines being outside of secondary containment. Upon discovery PPL aligned the central railroad bay ventilation to secondary containment.

This finding was greater than minor because it adversely impacted the Barrier Integrity cornerstone objective to ensure the capability of containment in that inadequate design control allowed the instrument lines in the central railroad bay to be outside of secondary containment. Allowing the instrument lines to be outside of secondary containment resulted in the plant being outside of the FSAR assumptions and analysis. This finding was considered to have very low safety significance (Green), using Phase-1 of the significance determination process. This finding was Green because the finding only represents a degradation of the radiological barrier function provided by secondary containment and the standby gas treatment system. (Section 1R04)

### Cornerstone: Occupational Radiation Safety

- C Green. A self-revealing non-cited violation of 10 CFR20.1501(a)(1) was identified for not conducting an adequate radiation survey to ensure compliance with the High Radiation Area (HRA) posting requirements of 10 CFR 20.1902(b) during the removal of spent fuel module shield walls. PPL posted and shielded the location and conducted occupational dose assessments for individuals working in the unposted high radiation area.

This finding is a greater than minor because PPL did not conduct adequate radiation surveys to ensure proper posting and control of the area. This finding was evaluated against the criteria in NRC Manual Chapter 609, Appendix C, and found to be of very low safety significance (Green) because it was not an ALARA finding, it did not involve an overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised.

The cause of this non-cited violation is related to the Human Performance cross-cutting area because PPL did not complete an adequate survey to identify a high radiation area. (Section 2OS1)

### Cornerstone: Public Radiation Safety

- C Green. A self-revealing non-cited violation of 10 CFR 20.2001 was identified. PPL's transfer of waste resin to Barnwell Low-Level Waste Disposal facility did not meet Barnwell's license requirements as required by 10 CFR 30.41. On October 25, 2004, Barnwell identified loose spent resin within the annular space between the waste container and transport cask. PPL suspended resin shipments until the cause of the October 25, 2004, event was identified and corrected.

This finding is a greater than minor performance deficiency because PPL failed to meet a waste disposal facility license requirement. This radioactive material control transportation finding was evaluated against criteria specified in NRC Manual Chapter 0609, Appendix D, and determined to be of very low safety significance (Green) because no radiation limits were exceeded, no package breach was involved, no certificate of compliance finding was involved, and

## Summary of Findings (cont'd)

although a low-level burial ground non-conformance was involved, burial ground access was not denied and no 10 CFR 61.55 waste classification issue was involved. (Section 2PS2)

### B. Licensee Identified Violation

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

## Report Details

### Summary of Plant Status

Susquehanna Steam Electric Station (SSES) Unit 1 began the inspection period at full power. On November 6, 2004, reactor power was reduced to 75% power to perform a condensate pump motor replacement. On November 20, 2004, reactor power was reduced to 17% and the main generator was taken off line to repair a main generator hydrogen leak. Unit 1 returned to full power on November 26, 2004, and continued to operate at full power for the remainder of the inspection period other than for rod sequence exchanges or rod pattern adjustments.

Unit 2 was operating at or near full power at the beginning of the inspection period. On October 29, 2004, reactor power was reduced to 68% for several hours to repair pipe supports on feedwater heater piping. Reactor power was reduced to 73% on November 29, 2004, due to an unexpected rapid increase in cooling tower screen debris. Unit 2 continued to operate at full power for the remainder of the inspection period, other than for rod pattern adjustments and planned rod sequence exchanges.

#### 1. **REACTOR SAFETY**

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

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

##### a. Inspection Scope

Adverse Weather Readiness. During the week of December 13, 2004, the inspectors reviewed PPL's preparations for cold weather. This included a review of open work on heat trace and other freeze protection measures. Plant walkdowns for selected structures, systems and components were performed to determine the adequacy of PPL's weather protection activities. The inspectors also reviewed and evaluated plant conditions related to severe cold weather and reviewed considerations in PPL's Maintenance Rule station risk assessment. This inspection activity represented one sample. The following documents were reviewed:

- C OP-185-001, "Freeze Protection System"
- C SO-100-006, "Shiftly Surveillance Operating Log"
- C NDAP-00-0024, "Winter Operation Preparations"
- C CR 631468, Condensate Storage Tank Heat Trace Trouble Alarm
- C CR 632090, Temperature Damper TD-27326A Fails to Operate
- C CR 630656, T-20 Startup Transformer Fans 7 & 9 Frozen in Place

##### b. Findings

No findings of significance were identified.

1R04 Equipment Alignments (71111.04Q - 2 Samples, 71111.04S - 2 Samples)1. Partial System Walkdowns (71111.04Q - 2 Samples)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. This inspection activity represented two samples. The walkdowns included the following systems:

- C Control Structure Ventilation - Emergency Mode Operation. (control room emergency outside air supply and floor cooling units)
- C Unit 1 Reactor Building - Secondary Containment Ventilation Zones.

b. Findings

Introduction: The inspectors identified a Green non-cited violation (NCV) for inadequate configuration control of secondary containment as required in 10 CFR 50, Appendix B, Criterion III, "Design control." Inadequate configuration control resulted in reactor recirculation system and residual heat removal system instrument lines, in the central railroad bay, to be outside of secondary containment.

Description: PPL did not correctly control the central railroad bay ventilation in accordance with the Final Safety Analysis Report (FSAR) assumptions and analysis. This area contains residual heat removal (RHR) and reactor recirculation (RR) instrument lines that are intended to be inside secondary containment as described in the FSAR. 10 CFR 50, Appendix B, Criterion III, "Design control," requires that the design basis be correctly translated into procedures. Station Procedure OP-134-002, "Reactor Building HVAC Zones 1 and 3," controls the configuration of secondary containment and section 2.11, "Normal Alignment of the Central Railroad Bay," allowed this area to be maintained outside of secondary containment.

The RHR system instrument lines for FI-15105A, "RHR Loop A Flow Indicator," FT-15105A, "RHR Loop A Flow Transmitter," FT-E11-1N013, "Reactor Vessel Head Spray Flow Transmitter," and PSH-E11-1N022A, "RHR Loop A Discharge Pressure," are routed through the central railroad bay. These instrument lines form part of the ASME pressure boundary and closed system containment boundary for the RHR system and represent an extension of primary containment. The Final Safety Analysis Report (FSAR) section 6.2.3.2.3, "Secondary Containment Bypass Leakage," states, in part, that "the secondary containment structure completely encloses the primary containment structure . . . so that leakage can be collected and filtered prior to release to the environment."

The RR system instrument lines for flow transmitters FT-B31-1N024A, "RR Loop A Flow," and FT-B31-1N024B, "RR Loop B Flow," are also in the central railroad bay. These instrument lines are connected to the reactor recirculation piping and contain

reactor coolant. The FSAR, Section 15.6.2, "Decrease in Reactor Coolant Inventory," assumed that for an instrument line break all the reactor coolant from the break would be contained within secondary containment. Failure of these instrument lines, when the railroad bay ventilation was aligned to be outside secondary containment, would have resulted in a potential for unfiltered and unmonitored radioactive material release bypassing the secondary containment.

Analysis: This finding was a performance deficiency because station procedure OP-134-002, "Reactor Building HVAC Zones 1 and 3," did not correctly control the central railroad bay to maintain the RR and RHR instrument lines inside of secondary containment as described in the FSAR assumptions and analysis. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or PPL procedures. This finding was more than minor because the lack of adequate design control affected the Barrier Integrity cornerstone objective to ensure the capability of containment and was associated with the cornerstone attribute of configuration control to preserve the containment boundary.

This finding was found to have very low safety significance (Green) using the NRC Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." This finding was Green because the finding only represents a degradation of the radiological barrier function provided by secondary containment and the standby gas treatment system.

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design control," requires, in part that, "that measures shall be established to assure that applicable regulatory requirements and the design basis (FSAR) for those structures, systems, and components to which Appendix B applies are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, the design basis for the Unit 1 Reactor Building railroad bay ventilation was not adequately translated into procedures. Specifically, procedure OP-134-002, "Reactor Building ventilation zones 1 and 3," did not have appropriate controls to ensure that the central railroad bay ventilation was maintained within secondary containment to ensure that the RHR system and RR system instrument lines were inside secondary containment as described in the FSAR. Because this violation is of very low safety significance and PPL entered this finding into their corrective action program (CR 621353), this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 50-387/04-05-01, Reactor Recirculation and Residual Heat Removal System Instrument Lines Outside of Secondary Containment)**

2. Complete System Walkdowns (71111.04S - 2 Samples)
  - a. Inspection Scope

The inspectors performed a complete system walkdown on the Unit 1 reactor core isolation cooling (RCIC) system to verify that the equipment was properly aligned. The inspectors reviewed system checkoff lists, system operating procedures, system emergency support procedure, the system piping and instrumentation diagram and the

FSAR. The inspectors evaluated outstanding maintenance activities and condition reports associated with the RCIC system to determine if they would adversely affect system operability. The inspectors also interviewed the system engineer to identify any outstanding design issues, temporary modifications and operator workarounds affecting RCIC system operation. The inspectors verified in the control room and in the RCIC system room that the valves, including locked valves, were correctly positioned and did not exhibit leakage that would impact the function of the valve. The inspectors also verified that all the major components were labeled, hangers and supports were functional and essential support system were operational.

The inspectors conducted a detailed review of the alignment and condition of the Unit 2 125V DC System including the batteries, battery chargers, and the station trailer mounted diesel generator (Blue Max). The inspectors also verified that the system design basis was maintained in the present system configuration and the battery room ventilation was adequate to prevent excessive hydrogen buildup. Corrective actions were reviewed for previous 125V DC issues. Weekly, quarterly, and biannual surveillances were reviewed for completeness and conformance to FSAR and Technical Specification requirements. These inspection activities represented two samples. The documents included in the reviews are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 12 Samples)

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 inspectors reviewed the respective pre-fire action plan procedures for the inspected areas. This inspection activity represented twelve samples. The inspected areas included:

- C Unit 1 lower switchgear room, procedure FP-113-222
- C Unit 1 core spray pump rooms 645', fire zones 1-1A, 1-1B
- C Unit 1 high pressure coolant injection pump room 645', fire zone 1-1C
- C Unit 1 upper cable spreading room, procedure FP-013-163
- C Unit 1 reactor building 749' and motor generator set, fire zone 1-SA-S
- C Unit 2 main turbine lube oil reservoir, procedure FP-213-283
- C Unit 2 residual heat removal pump rooms 645', fire zones 2-1E, 2-1F
- C Unit 2 reactor building 670', fire zones 2-2A, 2-2B
- C Unit 2 upper cable spreading room, procedure FP-013-162
- C Unit 2 upper relay room, procedure FP-013-161
- C Condensate pump rooms, recombiner room, procedure FP-213-270
- C "E" diesel generator building, procedure FP-013-236

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11B, 71111.11Q - 1 Sample)a. Inspection ScopeRoutine Licensed Operator Requalification Exam Results (71111.11B)

On December 6, 2004, the inspector conducted an in-office review of PPL's annual operating test and biannual written exam results for 2004. The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspectors verified that:

- Crew failure rate was less than 20%. (Crew failure rate was 5%.)
- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Individual failure rate was 3%.)
- Individual failure rate on the walk-through test was less than or equal to 20%. (Individual failure rate was 1.5%.)
- Individual failure rate on the comprehensive biennial written exam was less than or equal to 20%. (Individual failure rate was 3%.)
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 75%. (Overall pass rate was 92.7%.)

Simulator Evaluation (71111.11Q - 1 Sample)

On December 14, 2004, the inspectors observed licensed operator performance in the simulator during operator requalification training. The inspectors compared their observations to Technical Specifications, emergency plan implementation, and the use of emergency operating procedures. The inspectors also evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. This inspection activity represented one sample. The following training scenario was observed:

- C Licensed Operator Requalification simulator training scenario OP002-05-02-02, Loss of Instrument Bus / Shutdown Outside Control Room

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13 - 10 Samples)a. Inspection Scope

The inspectors reviewed the assessment and management of selected maintenance activities to evaluate the effectiveness of PPL's risk management for planned and



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

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

- C Unit 1 main generator H<sub>2</sub> leakage, November 20 - 24, 2004
- C Unit 1 "C" condensate pump partial discharge readings increased, CR 610556
- Unit 2 stator water coolant heat exchanger system leakage, CR606722
- C Unit 2 instrument air valve 225066 replacement, PCWO 359399
- C Unit 2 reactor protection system breakers 2-CB-S003B-B & 2-CB-S003B-D replacement, WO 610916
- C Unit 2 "B" loop core spray out of service / T-20 work, October 21, 2004
- C Unit 2 "A" loop residual heat removal flow oscillations, AR 617546, PCWO 617853
- C Unit 2 high pressure coolant injection system outage window, PCWO 506345
- C "A" standby gas treatment system fan trip / damper controller replacement, CR 609389
- C Wescosville 2S 500 KV circuit breaker overhaul, WR 156955

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions (71111.14 - 1 Sample)

a. Inspection Scope

Unit 1 Reduction to Seventeen Percent Power to Correct Main Generator Hydrogen Leak

On November 20, 2004, Unit 1 was reduced to 17% power to correct a main generator hydrogen leak. The Inspectors assessed personnel performance during the plant power changes including removal of the generator from service and the return to full reactor power. Inspectors evaluated operator actions and verified operator response was appropriate and in accordance with procedures and training. This inspection activity represented one sample.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 5 Samples)

a. Inspection Scope

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

- C Unit 1 Reactor coolant instrument lines in Unit 1 railroad bay, CR 621353
- C Terminations for core spray & residual heat removal pump motors, CR 609668
- C GE Part 21 reactor vessel level instrumentation, CR 606222
- C "C" Emergency diesel generator did not increase load, CR 616488, WO 616497
- C Testing of control structure envelope unfiltered in-leakage, CR 535347 and EWR 622198, Generic Letter 2003-001

b. Findings

Introduction: The inspectors identified a Severity Level IV violation of 10 CFR 50.59 requirements for not evaluating a change in plant system configuration that was known to be inconsistent with the FSAR Chapter 15 accident analysis. Specifically, the railroad bay ventilation was aligned to be outside of secondary containment on December 16, 20, 23, 2004 and on January 4, 2005.

Description: On November 23, 2004, the inspectors identified reactor recirculation system instrumentation lines, that contain primary coolant, were located in the Unit 1 reactor building central railroad bay. The railroad bay ventilation was aligned as an area outside of secondary containment. The accident analysis described in the FSAR assumed that these instrument lines were within secondary containment. As part of initial response to this non-conforming configuration, PPL re-aligned the railroad bay to be part of the secondary containment, evaluated the operability of the secondary containment function, and initiated condition report to address the problem. These actions were consistent with the NRC process for addressing non-conforming conditions described in Generic Letter 91-18. (details in Section 1R04)

On December 16, 20, 23, 2004, and on January 4, 2005, prior to the final resolution of the non-conforming condition, PPL used an established procedure to realign the railroad bay ventilation and place the railroad bay outside of secondary containment. The ventilation realignment was done to allow opening of the outer door to the railroad bay to bring new fuel to the refuel floor. The change in plant system configuration that placed primary coolant instrument lines outside of secondary containment resulted in

plant operation outside of the documented assumptions in the FSAR Chapter 15 accident analysis. The accident analysis assumed, that for a break of primary coolant instrument lines, the reactor coolant would be contained within the secondary containment.

PPL had performed an operability evaluation associated with the non-conforming configuration of primary coolant instrument lines being outside of secondary containment before realignment of the railroad bay ventilation to be outside of secondary containment. The inspectors reviewed PPL's operability evaluation, previous 10 CFR 50.59 evaluations, and the Susquehanna Safety Evaluation Report, NUREG 0776, which states in part, that "a circumferential rupture of an instrument line which is connected to the primary coolant system is postulated to occur inside the secondary containment." The inspectors did not find an adequate operability or 10 CFR 50.59 evaluation that provided the basis for why realignment of the railroad bay ventilation outside of secondary containment would not increase or create any of the conditions described in 10 CFR 50.59 (c)(2) i through viii.

On December 16, 2004, the inspectors discussed with PPL, the inspector position that the proceduralized activity for realigning the railroad bay ventilation outside of secondary containment is an activity that was inconsistent with the assumptions of the previously analyzed Chapter 15.6.2 accident and required the performance of a 10 CFR 50.59 analysis. The inspector noted that prior evaluations (mid-1990s) conducted per 10 CFR 50.59 to change ventilation alignment of the railroad bay to outside secondary containment were not adequate since they did not consider the instrumentation lines within the railroad bay. PPL maintained that their operability evaluation for the non-conforming condition provided a sufficient basis to allow the railroad bay to be outside secondary containment since the dose consequences from an instrument line break were still bounded by the worst case analyzed accident. The inspectors noted that the operability evaluation did not document an assessment of items i through viii in 10 CFR 50.59 (c)(2). Further, the inspectors concluded that the evaluation was not sufficient to establish operability of the secondary containment with the instrument lines outside of secondary containment since the assumptions of the instrument line break described in Chapter 15.6.2 were not maintained. For example, the inspectors noted that Susquehanna Safety Evaluation Report, NUREG 0776, considers a circumferential rupture of an instrument line which is connected to a reactor coolant system, but instead PPL's operability determination assumed a pipe crack. PPL did not take action to restore compliance with 10 CFR 50.59 during the inspection period. PPL continued to align the railroad bay ventilation outside of secondary containment. On January 15, 2005, PPL restored compliance by controlling and limiting the time that the railroad bay ventilation was aligned outside of secondary containment consistent with the Technical Specification (3.6.4.1) requirements for an inoperable secondary containment.

Analysis: This finding was addressed using traditional enforcement since it potentially impacts or impedes the regulatory process in that a required 10 CFR 50.59 evaluation was not performed and documented. This is contrary to the regulatory process that allows licensees to make changes without a license amendment provided that licensees will comply with 10 CFR 50.59 process. This finding is more than minor because, the finding is associated with the configuration control attribute of the containment function and negatively affects the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases

caused by accidents or events. Although the significance determination process (SDP) is not designed to assess the significance of violations that potentially impact or impede the regulatory process, the result of a 10 CFR 50.59 violation can be assessed by SDP. An SDP Phase 1 screening was performed and determined that the condition resulting from the violation of 10 CFR 50.59 was of very low safety significance (Green) because the finding only represents a degradation of the radiological barrier function provided by secondary containment and the standby gas treatment system.

Enforcement: Paragraph (c)(1) of 10 CFR 50.59 states that a licensee may make changes in the facility as described in the FSAR and conduct tests or experiments not described in the FSAR without obtaining a license amendment only if the change, test or experiment does not meet any of the criteria in paragraph (c)(2) of this section. Paragraph (d)(1) states that the licensee shall maintain records of changes to the facility made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for determination that the change does not require a license amendment. Contrary to the above, on December 16, 20, 23, 2004 and January 4, 2005 the licensee made a change to the facility as described in the FSAR and without obtaining a license amendment and did not verify that the change does not meet any of the criteria in paragraph (c)(2). Additionally, the licensee did not maintain a record of change to the facility including a written evaluation of the bases for determination that the change does not require a license amendment. Specifically, while moving new fuel to the refuel floor, PPL did not maintain instrumentation lines containing reactor coolant inside of secondary containment as evaluated and described in the FSAR. This change was implemented without an evaluation to determine if it resulted in a more than minimal increase in the frequency or consequences of the accident previously evaluated. This is a Severity Level IV Violation of NRC requirements in accordance with Section VI.A of the NRC Enforcement Policy (Supplement I - Reactor Operations; Example D.5). This violation is being cited in a Notice of Violation under Section VI of the NRC Enforcement Policy since PPL did not restore compliance within a reasonable time after the violation was identified nor did they enter the violation into a corrective action program to address recurrence. **(NOV 05000387/2004005-02, Failure to Complete 10 CFR 50.59 Analysis)**

1R16 Operator Work-Around (71111.16 - 2 Samples)

a. Inspection Scope

The inspectors reviewed the "D" emergency diesel generator motor operated potentiometer failure to increase load (CR625636) to determine how the affected system would impact the operator's ability to operate the diesel under emergency conditions. The inspectors also reviewed the aggregate impact of Unit 1 and Unit 2 documented operator workarounds and challenges, equipment deficiencies, and open operability evaluations. The inspectors evaluated the cumulative effects of these items on the ability of operators to respond in a correct and timely manner. The inspectors also reviewed these deficiencies to determine if there were any items that complicated the operators' ability to implement emergency operating procedures, but were not identified as operator workarounds. This inspection activity represented one individual sample and one cumulative effects sample of operator workarounds.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 8 Samples)a. Inspection Scope

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

- C October 1, 2004, "C" emergency diesel generator start time testing following air shuttle valve replacement, CR 597661
- C SM-258-003, reactor protection system "B" electrical protection assembly 24 month calibration and functional test after breaker replacement, CR 610916
- C October 10, 2004, SE-259-400, "residual heat removal / core spray / high pressure coolant injection / reactor core isolation cooling component post maintenance closed system test," PCWO 612562
- C October 28, 2004, SE-250-002 "logic system functional," and SO-250-002, "RCIC flow verification," following RCIC maintenance.
- C Valve time testing following motor replacement on HV-251-FO17B
- C November 14, 2004, "D" emergency diesel generator testing following work in high voltage cabinet
- C Standby gas treatment testing following maintenance, SO-070-001 and PCWO 609397
- C December 4, 2004, valve dynamic tests, high pressure coolant injection flow vibration logic system functional, following Unit 2 high pressure coolant injection system outage window, SO-252-002, SE-252-002

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 8 Samples)a. Inspection Scope

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

intended safety functions. This inspection activity represented eight samples. The observed or reviewed surveillance tests included:

- C SO-024-001D, "D Emergency Diesel Generator Surveillance Run,"
- C SO-258-003, "Semi-annual Division I Reactor Protection System Electrical Protection Assembly Functional Test,"
- C SO-251-805, "B Core Spray Comprehensive Flow Verification,"
- C SO-150-006, "Reactor Core Isolation Cooling Comprehensive Flow Verification,"
- C SO-024-0016, "C Emergency Diesel Generator Monthly Operability Test,"
- C SR-155-004, "Control Rod Drive Scram Time Testing & RE-OTP-103, Stroke Time Testing," on four "rippled" control rods,
- C SO-070-001, "Standby Gas Treatment System Monthly Test,"
- C SE-159-021, "Local Leak Rate Test of Main Steam Line Isolation Valve Penetration X-7A"

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modification (71111.23 - 2 Samples)

a. Inspection Scope

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

- C T mod 584563 Rev 1, Unit 2 turbine trips bypassed
- C T mod 623417, Unit 1 main generator hydrogen makeup flow alarm setpoint

b. Findings

No findings of significance were identified.

### **Cornerstone: Emergency Preparedness**

#### 1EP4 Emergency Action Level and Emergency Plan Changes

##### a. Inspection Scope (IP 71114.04 - 1 Sample)

A regional in-office review was conducted of licensee-submitted revisions to the emergency plan, implementing procedures and emergency action levels (EAL) which were received by the NRC during the period of October - December 2004. A thorough review was conducted of plan aspects related to the risk significant planning standards (RSPS), such as classifications, notifications and protective action recommendations. A cursory review was conducted for non-RSPS portions. These changes were reviewed against 10 CFR 50.47(b) and the requirements of Appendix E and they are subject to future inspections to ensure that the combination of these changes continue to meet NRC regulations. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, and the applicable requirements in 10 CFR 50.54(q) were used as reference criteria. This inspection activity represents one sample.

##### b. Findings

No findings of significance were identified.

## **2. RADIATION SAFETY**

### **Cornerstones: Occupational Radiation Safety and Public Radiation Safety**

#### 2OS1 Access Control to Radiologically Significant Areas (71121.01 - 9 Samples)

##### a. Inspection Scope

The inspector reviewed and assessed the adequacy of PPL's internal dose assessment for any actual internal exposure greater than 50 mrem committed effective dose equivalent (CEDE). The inspector examined PPL's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools. The inspector also reviewed self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection. The inspector determined that identified problems were entered into the corrective action program for resolution. For repetitive deficiencies or significant individual deficiencies in problem identification and resolution previously identified, the inspector determined that PPL's self-assessment activities were also identifying and addressing these deficiencies.

The inspector reviewed PPL documentation packages for all performance indicator (PI) events occurring since the last inspection.

The inspector selected jobs being performed in radiation areas, airborne radioactivity areas, or high radiation areas (less than 1 R/hr) for observation. The inspector reviewed all radiological job requirements and observed job performance with respect to these requirements. The inspector determined that radiological conditions in the work area were adequately communicated to workers through briefings and postings. The jobs

reviewed and observed included the removal and replacement of the filter elements in the 2B condensate filtration system filter.

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

These inspection activities represented nine samples. The documents reviewed are provided in the Attachment.

In addition the inspector reviewed Licensee Event Reports, Special Reports, audits, State agency reports, and self-assessments related to the radioactive material and transportation programs performed since the last inspection to determine that identified problems were entered into the corrective action program for resolution. The inspector also reviewed corrective action reports written against the radioactive material and shipping programs since the previous inspection. The inspector reviewed PPL's evaluation of the detection of an unposted High Radiation Area during preparation of a spent fuel storage horizontal module (B-5) on September 16, 2003 (CR 509273). These reviews were conducted using the requirements contained in 10 CFR 20.

b. Findings

Introduction: A green self-revealing non-cited violation of 10 CFR20.1501(a)(1) was identified for not conducting an adequate radiation surveys to ensure compliance with the High Radiation Area posting requirements of 10 CFR 20.1902(b) during the removal of spent fuel storage module shield walls.

Description: On August 20 and 21, 2003, PPL workers removed the shield walls from two empty horizontal spent fuel storage modules (HSMs)(B-4, C-4) in preparation for installing six additional HSMs. Radiation protection personnel performed radiation surveys to support removal of shielding from the modules due to potential radiation streaming from previously filled HSMs. The radiation protection personnel briefed workers on the apparent radiation dose rates during installation and preparation of the new modules during the period August 21, 2003 - September 16, 2003. During work on September 16, 2003, on module B-5 one worker's integrating alarming dosimeter alarmed. The worker left the area, informed radiation protection, and an investigation was initiated. The worker's dosimeter alarmed due to the dosimeter exceeding its alarm set point. Radiation protection personnel conducted detailed radiation surveys to identify the apparent cause of the alarm and identified, a previously undetected High Radiation Area that was accessible to personnel. The area exhibited radiation dose rates of 170 mr/hr at 30 centimeters from the wall in the B-5 module. Subsequent PPL review identified that the High Radiation Area was associated with radiation streaming through an overhead air vent from an adjacent HSM B-4, where the shielding had been removed. The High Radiation Area had not been identified after removal of shielding on August 21, 2003.

PPL suspended work, posted the area, conducted occupational radiation dose assessments, installed shielding as appropriate, and placed the issue in its corrective



action program. Although the area was accessible, the worker's dose alarm was believed not to be attributable to the undetected High Radiation Area. Notwithstanding, PPL conducted occupational dose assessments to assess possible additional dose from the undetected High Radiation Area. PPL identified several individuals who sustained additional dose but none of the individuals were estimated to receive greater than 100 millirem.

Analysis: This finding is a performance deficiency because PPL did not detect and post a High Radiation Area, exhibiting accessible radiation dose rates of 170mr/hr at 30 centimeters. The finding is not subject to traditional enforcement in that the finding did not have any actual safety consequence, did not have the potential for impacting the NRC's ability to perform its regulatory function, and there were no willful aspects. In addition, this finding specifically involved the station's basic radiological controls program.

The finding was greater than minor in that it is associated with the program and process attribute (exposure control and monitoring) of the Occupational Radiation Safety Cornerstone and did affect the cornerstone. Specifically, PPL's programs and processes did not detect an accessible High Radiation Area and ensure appropriate postings and controls were in-place to preclude workers unknowingly entering and working in the area. The finding was evaluated against criteria specified in NRC Manual Chapter 0609, Appendix C, and determined to be of very low safety significance (Green), in that it was not an As Low As Is Reasonable Achievable (ALARA) finding, no overexposure occurred, there was no substantial potential for an overexposure, and the ability to assess dose was not compromised. (CR 509273).

The cause of this non-cited violation is related to the Human Performance cross-cutting area because PPL did not complete an adequate survey to identify a high radiation area. This resulted in an unposted high radiation area at the HSM B-5.

Enforcement: 10 CFR 20.1501 requires that necessary and reasonable radiological surveys be conducted to evaluate potential radiological hazards including High Radiation Areas as required by 10 CFR 20.1902(b). Contrary to this requirement, due to inadequate radiation surveys, PPL did not detect a High Radiation Area in storage module B-5 following shield removal in August 2003. This is a violation of 10 CFR 20.1501. Because this finding was of very low safety significance (Green), and PPL entered this finding into its corrective action program, this violation is being treated as a Non-Cited Violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. NUREG-1600. **(NCV 05000387/2004005-03, Failure to Post Horizontal Spent Fuel Storage Module B-5 as a High Radiation Area)**

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

### a. Inspection Scope

The inspector reviewed PPL's self-assessments, audits, and special reports related to the ALARA program since the last inspection. The inspector determined that PPL's overall audit program's scope and frequency (for all applicable areas under the Occupational Cornerstone) meet the requirements of 10 CFR 20.1101(c).

The inspector determined that identified problems are entered into the corrective action program for resolution. The inspector reviewed dose significant post-job (work activity) reviews and post-outage ALARA report critiques of exposure performance, and determined that identified problems are properly characterized, prioritized, and resolved in an expeditious manner. This inspection activity represented two samples. The documents reviewed are provided in the Attachment.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation (71121.03 - 2 Samples)

a. Inspection Scope

The inspector reviewed PPL's self-assessments, audits, and Licensee Event Reports and focused on radiological incidents that involved personnel contamination monitor alarms due to personnel internal exposures. For repetitive deficiencies or significant individual deficiencies in problem identification and resolution, the inspector determined that PPL's self-assessment activities are also identifying and addressing these deficiencies.

The inspector reviewed documents related to PPL's processing of thermoluminescent dosimeters (TLDs) to measure personnel dose of record. Documents reviewed included the most recent laboratory testing (Personnel Dosimetry Performance Testing Report dated January 9, 2004) and laboratory audit (On-Site Assessment 100554-0, February 2003) of PPL's program and facility by the National Voluntary Laboratory Accreditation Program (NVLAP). This inspection activity represented two samples. The documents reviewed are provided in the Attachment.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Materials Processing and Shipping (7112202 - 6 Samples)

a. Inspection Scope

The inspector reviewed the solid radioactive waste system description presented in the FSAR and the recent radiological effluent release report for information on the types and amounts of radioactive waste disposed, and also reviewed the scope of PPL's audit program to verify that it met the requirements of 10 CFR 20.1101.

The inspector walked-down and visually inspected the liquid and solid radioactive waste processing systems to verify that the current system configuration and operation was consistent with the descriptions provided in the FSAR and the Process Control Program. The inspector reviewed the status of radioactive waste process equipment that was not operational or abandoned in place and verified that applicable changes were reviewed and documented in accordance with 10 CFR 50.59, as appropriate. In addition, the inspector reviewed current processes for transferring radioactive waste resin and sludge

discharges into shipping/disposal containers to determine if appropriate waste stream mixing and/or sampling procedures, and methodology for waste concentration averaging, provided for representative samples of the waste product for the purposes of 10 CFR 61.55 waste classification.

The inspector reviewed the radiochemical sample analysis results for each of the station's radioactive waste streams; reviewed the PPL's use of waste scaling factors and calculations used to account for difficult-to-measure radionuclides; verified that the program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20; and, reviewed the program to ensure that the waste stream composition data accounted for changing operational parameters and remained valid between the annual or biennial sample analysis updates.

The inspector observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and PPL verification of shipment readiness; verified that the requirements of any applicable transport cask Certificate of Compliance had been met; verified that the receiving licensee was authorized to receive the shipment packages; and, observed radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation activities. The inspector determined that shippers were knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to NRC Bulletin 79-19 and 49 CFR Part 172 Subpart H; and verified that PPL's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

The inspector sampled non-excepted package shipment records and reviewed these records for conformance with applicable NRC and DOT requirements.

b. Findings

Introduction: A green self-revealing non-cited violation of 10 CFR 20.2001 was identified. PPL's transfer of waste resin to Barnwell Low-Level Waste Disposal facility did not meet Barnwell's license requirements as required by 10 CFR 30.41. On October 25, 2004, Barnwell identified loose spent resin within the annular space between the waste container and transport cask which is prohibited by Barnwell's license (License No. 097, Condition 61).

Description: On October 25, 2004, personnel from the South Carolina Department of Health and Environmental Control, conducted an inspection of a shipment of radioactive waste (04-155) from SSES. Shipment 04-155 was a polyethylene waste container filled with a mixture of filter sludge and spent bead resin, placed inside an NRC-licensed Type B shipping packaging (10-142B cask [USA/9208/B]). During off-loading and removal of the container from the cask at Barnwell, radioactive resin was observed on the bottom of the shipping cask. The resin was collected, surveyed, and found to exhibit low radiation levels. PPL was subsequently notified by the Barnwell Low-Level Waste Disposal Facility that shipment 04-155, shipped from the SSES, had radioactive resin outside the waste disposal container, in violation of the waste disposal facility's site operating license (License No. 097, Condition 61), in that PPL did not package the shipment in a manner that would prevent the release of radioactive waste into the shipping container.

The inspector's review identified that following loading of the waste container into the cask at SSES, a quantity of spent resin was found on the upper surface of the waste container. PPL vacuumed off this material prior to closing the cask, however, some material remained in the annular space between the shipping container (cask) and waste container, unknown to the licensee.

Analysis: This finding is a performance deficiency because PPL did not meet the disposal license condition which was reasonably within PPL's ability to foresee and correct, and which should have been prevented. The finding is not subject to traditional enforcement in that the finding did not have any actual safety consequence, did not have the potential for impacting the NRC's ability to perform its regulatory function, and there were no willful aspects.

The finding was greater than minor in that it is associated with the program and process attribute (radioactive material control/transportation) of the Public Radiation Safety cornerstone and did affect the cornerstone. Specifically, PPL did not meet the requirements of Barnwell disposal facility's operating license to provide for proper packaging of waste for shipment to prevent release of radioactive waste into the shipping container. The finding was evaluated against criteria specified in NRC Manual Chapter 0609, Appendix D, and determined to be of very low safety significance (Green), because no radiation limits were exceeded, no package breach was involved, no certificate of compliance finding was involved, and although a low-level burial ground non-conformance was involved, burial ground access was not denied and no 10 CFR 61.55 waste classification issue was involved. The small quantity of loose resin was contained within the confines of the shipping cask. PPL suspended resin shipments when notified and placed the issue in its corrective action program (CR 613944).

Enforcement: 10 CFR 2001 and 10 CFR 30.41 require that the licensee may only transfer licensed materials to a person authorized to receive such material under terms of a specific license issued by an Agreement State. Condition 61, of License 097 (Amendment 48) issued for the operation of the Barnwell Waste Management Facility by the State of South Carolina (an Agreement State), prohibits packaging of shipments in a manner that would result in release of radioactive waste into the shipping container. Contrary to this requirement, loose waste resin was found within the annulus space between the resin container and the shipping container (cask) for SSES shipment No. 04-155 on October 25, 2004. This is a violation of 10 CFR 20.2001. Because this finding was of very low safety significance (Green), and PPL entered this finding into its corrective action program, this violation is being treated as a Non-Cited Violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. NUREG-1600. **(NCV 05000387/2004005-04, Failure to correctly Package Waste Resin for Shipment)**

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151 - 16 Samples)

###### **Cornerstone: Reactor Safety**

###### a. Inspection Scope

The inspectors reviewed PPL's performance indicator (PI) data, for the period of November 2003 through November 2004, to verify whether the PI data was accurate and complete. The inspectors examined selected samples of PI data, PI data summary reports, and plant records. The inspectors compared the PI data against the guidance contained in Nuclear Energy Institute (NEI) 99-02, revision 2, "Regulatory Assessment Performance Indicator Guideline." The inspectors also observed a chemistry technician obtain a reactor water sample on December 23, 2004. This inspection activity represented 14 samples. The following indicators and PPL documents were included in this review:

###### Initiating Event Performance Indicators

- Units 1 & 2 Unplanned Scrams per 7000 Critical Hours
- Units 1 & 2 Scrams With Loss of Normal Heat Removal
- Units 1 & 2 Unplanned Power Changes per 7000 Critical Hours

###### Mitigating Systems Performance Indicators

- Units 1 & 2 Emergency AC Power System Unavailability
- Units 1 & 2 Residual Heat Removal System Unavailability

###### Barrier Integrity Performance Indicators

- Units 1 & 2 Reactor Coolant System (RCS) dose equivalent iodine specific activity
- Units 1 & 2 RCS Identified leak rate measured by the drywell leakage calculation

###### PPL Documents

- Units 1 & 2 Control Room Logs
- NDAP-QA-0737, "Regulatory Performance Assessment"
- Technical Specification 3.4.4, "RCS Operational Leakage"
- SO-100/200-006, "Shiftly Surveillance Operating Log"
- SC-176/276-102, "Reactor Coolant Dose Equivalent Iodine-131"
- Units 1 & 2 Licensee Event Reports

**Cornerstone: Occupational Radiation Exposure**a. Inspection Scope (71151 - 1 Sample)

The inspector reviewed all licensee performance indicators (PIs) for the Occupational Exposure Cornerstone for follow-up. The inspector reviewed a listing of licensee event reports for the period January 1, 2004 through November 28, 2004 for issues related to the occupational radiation safety performance indicator, which measures non-conformance 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 inspector determined if any of these PI events involved dose rates greater than 25 R/hr at 30 centimeters or greater than 500 R/hr at 1 meter. If so, the inspector determined what barriers had failed and if there were any barriers left to prevent personnel access. For unintended exposures greater than 100 mrem TEDE (or greater than 5 rem SDE or greater than 1.5 rem LDE), the inspector determined if there were any overexposures or substantial potential for overexposure. This inspection activity represents one sample.

b. Findings

No significant findings or observations were identified.

**Cornerstone: Public Radiation Safety**c. Inspection Scope (71151 - 1 Sample)

The inspector reviewed a listing of licensee event reports for the period January 1, 2004 through November 28, 2004, 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. This inspection activity represents one sample.

b. Findings

No significant findings or observations were identified.

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

Annual Sample Review - ESW Equipment Replacement/Flow Balance/Modeling Issues  
(71152 - 1 Annual Sample)

Inspectors reviewed the effectiveness of corrective actions associated with the Emergency Service Water (ESW) system flow balance and the associated emergency heat sink safety function. This sample included a review of corrective actions associated with valve seat leakage to reactor building closed cooling water, turbine building closed cooling water and the alternate train of the 'E' Emergency Diesel Generator ESW cooling. NCV 2001005-001 identified leakage paths that were not tested that could impact safety by diverting the cooling water flow from Emergency Service Water to interfacing systems. Although the testing of these leakage paths was implemented promptly in 2001 to assure system operability, several of the long-term actions to restore system health by replacing these and other system boundary valves were completed by PPL in 2004. Inspectors screened a collection of corrective actions associated with maintaining the design cooling water flows to ESW cooled components. Inspectors reviewed the conditions adverse to quality entered into the PPL corrective action system and those in progress during the year to determine the aggregate impact on the ability of the ESW system to perform safety functions.

Inspectors reviewed the results of the ESW system flow balance, TP-054-076, as well as comprehensive pump testing results and compared this performance information to the flow models used previously to evaluate system operability and system performance trends. ESW measured flows were compared to FSAR assumptions and values used in design calculations. Inspectors concentrated review on the corrective actions identified by engineering or associated with recent field observations of equipment performance or configuration such as unexpected valve throttle position. Corrective Action reports and the other technical references reviewed are listed in the Attachment. The inspectors found that concerns and issues for the ESW system were identified, documented and properly evaluated through the PPL corrective action program.

#### Semi-Annual PI&R Trend Review (71152 - 1 Semi-Annual Sample)

The inspectors reviewed 221 action request (AR) items that were categorized as Management sub type, Chemistry and Effluents, as part of the semi-annual baseline inspection documented in this report. Fifteen of the ARs were reviewed in detail to verify whether the full extent of the issues were adequately identified, appropriate evaluations were performed, and reasonable corrective actions were identified. The inspectors evaluated the ARs against the requirements of NDAP-QA-0702, "Action Request and Condition Report Process," and 10 CFR 50, Appendix B. The 15 ARs reviewed in detail were: 582584, 583122, 583526, 584603, 586479, 585323, 589980, 582686, 586411, 586411, 591296, 595712, 599809, 604772, and 612621.

#### Routine PI&R Review

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 extent 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. During this inspection period, the inspectors performed a screening review of each item that PPL entered into their corrective action program, to assess whether there were any

unidentified repetitive equipment failures or human performance issues that might warrant additional follow-up.

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Follow-up (71153 - 1 Sample)

1. (Closed) LER 05000387/2004-004-00 Radiation Monitors Inoperable During Spent Fuel Cask Transport - Operation Prohibited by Technical Specification

On August 20, 2004, PPL discovered that the Secondary Containment Zone 3 isolation relays for both process radiation monitor in the central railroad access bay were disabled. These trips had been disabled on July 16, 2004, when an Instrument & Control Technician incorrectly executed steps in procedure IC-079-012, "Railroad Access Shaft Radiation Monitor Alarm / Trip Disabling." On August 2, and August 16, 2004, spent fuel storage casks had been moved in this area. Technical Specification 3.3.6.2, "Secondary Containment Isolation Instrument," and 3.3.7.1, "Control Room Emergency Outside Air Supply System," require the railroad access shaft radiation monitors be operable during movement of irradiated fuel in the railroad access shaft. Corrective actions included reaffirm work standards with the individuals and a plan to provide this information to all maintenance personnel. This finding is more than minor because the radiation monitors would not have functioned automatically in response to a radiological condition in the railroad access shaft (Zone 3 - spent fuel pool zone). The finding affects the Barrier Integrity Cornerstone and was considered to have very low safety significance (Green) using a Phase -1 SDP, because the finding only represented a degradation of the radiological barrier for the control room and spent fuel pool zone. The enforcement aspects of the violation are discussed in Section 4OA7. This LER is closed.

4OA4 Cross Cutting Aspects of Findings

Cross Reference to Human Performance Findings Documented Elsewhere

Section 2OS1 describes an NCV where PPL did not complete an adequate survey to identify a high radiation area. This resulted in an unposted high radiation area at the horizontal spent fuel module B-5.

4OA6 Meetings, Including Exit

On January 13, 2005, the resident inspectors presented the inspection results to Mr. R. Saccone, Vice President - Nuclear Operations, and other members of your staff, who acknowledged the findings.

4OA7 Licensee-identified Violations

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



- C Technical Specification 3.3.6.2, "Secondary Containment Isolation Instrument," and 3.3.7.1, "Control Room Emergency Outside Air Supply System," require the railroad access shaft radiation monitors be operable during movement of irradiated fuel in the railroad access shaft. Contrary to this on August 2, and August 16, 2004, spent fuel storage casks had been moved in this area. This was identified in the PPL corrective action program as CR 600250. This finding is of very low safety significance because it only represented a degradation of the radiological barrier for the control room and spent fuel pool zone.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION****KEY POINT OF CONTACT****1R04 Equipment Alignment**

Kevin Daly - Lead Engineer

John Vandenberg - Backup Engineer

**1R04 Equipment Alignment**

Paul Capotos

Len Casella

John Rotha

Phil Brady

Eric Miller

**1R11 Licensed Operator Requalification**

B. Stitts, Susquehanna Training Department

**2PS2 Radioactive materials Processing and Shipping**

D. Davis, Technical Training Instructor

R. Hock, Radiological Operations Supervisor

J. Meter, Licensing Engineer

M. Micca, Health Physicist - Waste Shipping

V. Schuman, Radiation Protection Manager

V. Zukauskas, Jr., Health Physics Foreman

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened

05000387, 388/2004005-02      NOV      Failure to Complete 10 CFR 50.59 Analysis

Opened and Closed

05000387/2004005-01      NCV      Reactor Recirculation and Residual Heat Removal System Instrument Lines Outside of Secondary Containment

05000387/2005/005-03      NCV      Failure to Post Horizontal Spent Fuel Storage Module B-5 as a High Radiation Area

05000387/2004005-04      NCV      Failure to Correctly Package Waste Resin for Shipment

Closed

05000387/2004-004-00      LER      Radiation Monitors Inoperable During Spent Fuel Cask Transport - Operation Prohibited by Technical Specification

**LIST OF BASELINE INSPECTIONS PERFORMED**

**2PS2 Radioactive materials Processing and Shipping**

7112101	Access Control	2OS1
7112202	Radioactive Material Processing and Shipping	2PS2
71151	Performance Indicator Verification	4OA1

**LIST OF DOCUMENTS REVIEWED**

(Not Referenced in the Report)

**Section 1R04: Equipment Alignment**

P&ID

Reactor Core Isolation Cooling - PPL drawing no E106254, AE drawing no -149, Rev 46  
 Reactor Core Isolation Cooling - PPL drawing no E106255, AE drawing no -150, Rev 26

Procedures & Checkoff list

RCIC manual injection with a loss of AC and DC power -ES 150(250)-003  
 Electrical - CL-150-0011 Rev - 11  
 Mechanical - CL-150-0012 Rev - 18  
 Containment - CL-150-0013 Rev 5

Notifications

CR 478799	CR 654600	CR 613953
CR 613952	CR 613776	CR 613573
CR 613555	CR 608809	CR 575709
CR 468503	CR 614504	CR 614407
CR 614319	CR 604479	CR 597589
CR 596983	CR 596900	CR 571749
CR 571046	CR 538717	CR 538717

Action Request and Change Request

CRA 491260	AR 354431	AR 616048
AR 616053	AR 616056	AR 616057

System Health Report

RCIC Unit 1 and Unit 2 dated 08/21/2004

Miscellaneous

UFSAR - 5.4.6 Reactor core isolation cooling  
 Info Rev 0, 03/28/83 - Reactor core isolation

Documents Calculations

EC-SBOR-0501                      SBO Coping Assessment  
 EC-SBOR-0506, Rev 0, 5/19/94      SBO Required Coping Duration  
 EC-002-1031, Rev 5, 8/25/04125V DC Load Profiles

A-3

EC-002-0505, Rev 13, 11/8/04	Unit 2, D Battery Load Profile Calculation
EC-002-0504, Rev 25, 11/15/04	Unit 2, B Battery Load Profile Calculation
EC-088-0526, Rev 2, 12/29/2000	Battery Room Hydrogen Generation
EC-013-0561, Rev 6, 1/2/01	Appendix R - HVAC Study

Design Basis

DBD001, Rev 4, 9/25/03	Design Basis Document for Class 1E DC Electrical
FSAR Section 8.3.2	DC Power Systems

Procedures/Surveillances

OP-202-001, Rev 13, 8/17/04	125V DC System Operation
EO-200-030, Rev 16, 1/14/04	Unit 2 Response to Station Blackout
SM-202-001, Completed 12/8/04	Weekly Battery Surveillance
SM-202-002, Completed 12/2/04	Quarterly Battery Surveillance
SM-202-D04, Completed 3/21/03	48-Month Modified Performance Test

AR/CRs

550022	Correction to Unit 1, A 125V battery load profile
550397	Review of all battery load profiles
473769	Battery testing documentation
339039	Battery charger voltage not within limits 3 times
221157	Replacement of mixed cells in Unit 2, D 125V battery

Generated as a result of this inspection

625328	Inaccuracy in FSAR section 8.3.2.1.1.5 regarding battery cell classification
627984	TS 3.8.4.7 is not met due to unreasonable 60 month exception note

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

Susquehanna Emergency Response Plan and Implementing Procedures

**Section 2PS2: Radioactive materials Processing and Shipping**

Radioactive Material Shipments: 04-146; 04-151; 04-154; 04-155; 04-156  
Quality Assurance Internal Audit Report No. 435295, "Solid Radwaste"  
Self-Assessment HPS-04-02, "EPRI Liquid Radwaste Management Assessment"  
Low Level Waste Characterization Study, October 2003  
Radiological Profile Report, "Unit 1 Thirteenth Cycle"  
Procedures: HP-TP-103, Rev 3, Plant Radiation Profile  
HP-TP-721, Rev 3, Gamma-to-Alpha Ratio Determinations  
NTP-QA-53.3, Rev 3, Hazardous Materials Handling, Packaging, Shipping and Transportation Training Program  
WM-PS-100, Rev 9, Shipment of Radioactive Waste  
WM-PS-110, Rev 5, General Shipment of Radioactive Material  
WM-PS-210, Rev 7, Packaging and Loading of DAW and Radioactive Material  
WM-PS-310, Rev 3, Use of the 10-142B Shipping Cask  
Lesson Plans: MST-320, Hazardous Material Shipping and Handling Large Quantities  
MST-325, Hazardous Material/Shipping and Handling  
MST-336, DOT Security Awareness and Plan

HP-230, Receipt and Shipment of Radioactive Material  
HS-053, Hazmat Employee Training for Container Loaders  
EF-009, Qualified Loader of Radioactive Material  
HP-242, Fundamentals of Radwaste Shipping  
HP-246, Radwaste Shipping Technician Orientation  
HP-248, Use of Shipping Document Computer Programs

Condition Reports: 621672; 613944; 602411; 597666; 594215; 593074; 600491; 600517;  
603630; 610452; 616287

**Section 40A2: Identification and Resolution of Problems**

Procedures

OP-054-001, Revision 22, Emergency Service Water System  
SO-024-014,  
TP-054-076  
SO-054-002

AR/CRs

544629,	548869	550087	551225
552695	572573	593354	594262
604482	604960	621817	

EWRs and Calculations

EWR # 552695  
EWR # 329234  
CRA # 550719  
CRA # 557738  
ESW-054-0511  
EC-Valv-0571

FSAR

Tables 9.2-4 and 9.2-3

Miscellaneous

D107295, Schematic ESW Pump 0P504C  
ESW System Health Report

**LIST OF ACRONYMS**

ALARA	As Low As Is Reasonably Achievable
ASME	American Society of Mechanical Engineers
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CR	Condition Report
EAL	Emergency Action Level
ESW	Emergency Service Water
FSAR	[SSES] Final Safety Analysis Report
HP	Health Physics
HSM	Horizontal Storage Module
HVAC	Heating, Ventilation and Air-Conditioning
KV	Kilovolts
LDE	Lens Dose Equipment
LER	Licensee Event Report
NCV	Non-cited Violation
NDAP	Nuclear Department Administrative Procedure
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PI	[NRC] Performance Indicator
PI&R	Problem Identification and Resolution
PPL	PPL Susquehanna, LLC
RCIC	Reactor Core Isolation Cooling
RG	[NRC] Regulatory Guide
RHR	Residual Heat Removal
RR	Reactor Recirculation
RSPS	Risk Significant Planning Standard
SDE	Skin Dose Equivalent
SDP	Significant Determination Process
SSES	Susquehanna Steam Electric Station
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter
VHRA	Very High Radiation Area
WO	Work Order