UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

August 13, 2010

Mr. Timothy S. Rausch
Senior Vice President and Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd. - NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – NRC INTEGRATED INSPECTION REPORT 05000387/2010003 AND 05000388/2010003

Dear Mr. Rausch:

On June 30, 2010, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed integrated inspection report presents the inspection results, which were discussed on July 19, 2010, with you and other members of your staff.

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

This report documents two NRC-identified findings and two self-revealing findings of very low safety significance (Green). All findings were determined to involve violations of NRC requirements. Additionally, one licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance and because they are entered into your correction action program (CAP), the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Susquehanna Steam Electric Station. In addition, if you disagree with the cross-cutting aspect of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Susquehanna Steam Electric Station.

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 Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Paul G. Krohn, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosures: Inspection Report 05000387/2010003 and 05000388/2010003
Attachment: Supplemental Information

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Sincerely,
/RA/
Paul G. Krohn, Chief
Projects Branch 4
Division of Reactor Projects

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REGION I

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| Docket No: | 50-387, 50-388 |
| License No: | NPF-14, NPF-22 |
| Report No: | 05000387/2010003 and 05000388/2010003 |
| Licensee: | PPL Susquehanna, LLC |
| Facility: | Susquehanna Steam Electric Station, Units 1 and 2 |
| Location: | Berwick, Pennsylvania |
| Dates: | April 1, 2010 through June 30, 2010 |
| Inspectors: | P. Finney, Senior Resident Inspector<br>J. Greives, Resident Inspector<br>J. Bream, Acting Resident Inspector<br>E. Torres, Acting Resident Inspector<br>A. Rosebrook, Senior Project Engineer<br>J. Furia, Senior Health Physicist<br>E. Huang, Reactor Inspector |
| Approved By: | Paul G. Krohn, Chief<br>Projects Branch 4<br>Division of Reactor Projects |

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## SUMMARY OF FINDINGS

IR 05000387/2010003, 05000388/2010003, 04/01/2010 – 06/30/2010; Susquehanna Steam Electric Station, Units 1 and 2; Maintenance Effectiveness, Maintenance Risk Assessment and Emergent Work Control, Operability Evaluations, and Post-Maintenance Testing

The report covered a 3-month period of inspection by resident inspectors, and announced inspections by regional reactor inspectors. Four Green non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Cross-cutting aspects associated with findings are determined using IMC 0310, "Components Within The Cross-Cutting Areas," dated February 2010. 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 4, dated December 2006.

**Cornerstone: Mitigating Systems**

- Green: A self-revealing, Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," occurred when PPL failed to correct a condition adverse to quality associated with the 1D intermediate range monitor (IRM) prior to a second reactor startup resulting in its failure and the aggregate of two IRMs inoperable in the same trip system. PPL inserted all control rods, placed the unit in Mode 3 to conduct IRM repairs, and entered the issue in PPL's corrective action program (CAP).

  The finding was more than minor since it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected its objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the reliability and capability of the IRM system was impacted by the 1D failure. In accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," the finding was determined to be of very low safety significance (Green) because the finding was not a design or qualification deficiency, did not represent a loss of a system/train safety function, and did not screen as potentially risk significant due to external events. This finding had a cross-cutting aspect in the area of Human Performance, Decision Making, in that PPL did not use conservative assumptions in decision making [H.1(b)]. Specifically, PPL did not consider other failure mechanisms as possible causes for the 1D IRM's degraded condition and adopted a troubleshooting approach of proving an expectation vice disproving all other possible causes. (Section 1R12)

- Green: A self-revealing, Green NCV of 10 CFR 50.65(a)(4), occurred when PPL failed to conduct an adequate risk assessment of online maintenance activities on April 22, 2010. A maintenance activity that caused the 11B bus tie supply feeder breaker from the startup transformer (Breaker 1A10204) to be inoperable was not modeled in the equipment out-of-service (EOOS) risk model despite work being commenced. A reactor scram occurred that day during unrelated testing and was complicated by the resulting equipment configuration that included the loss of the 11B Bus and its associated "B"

reactor recirculation pump and "B" condensate pump. Additionally, the "B" and "C" reactor feed pump turbines (RFPTs) tripped due to low suction pressure caused by the loss of the "B" condensate pump. When the maintenance activity was properly modeled, plant risk was reclassified from Green to Yellow. PPL entered the issue in their CAP and is conducting an evaluation of their work planning process.

This NCV affected the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The item is similar to example 7.e. in IMC 0612 Appendix E, "Examples of Minor Issues," in that failure to perform an adequate risk assessment when required by 10 CFR 50.65 (a)(4) is "not minor if the overall elevated plant risk would put the plant into a higher licensee established risk category." In this case, plant risk went from Green to Yellow when the maintenance was properly modeled; therefore, the violation is more than minor. The inspectors evaluated the finding using IMC 0612 Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Since the incremental core damage probability deficit was less than 1 E-6 and the incremental large early release probability deficit was less than 1 E-7, this finding is determined to be of very low safety significance (Green). This finding was determined to have a cross-cutting aspect in the area of Human Performance, Work Control in that PPL failed to appropriately plan work activities by not incorporating risk insights associated with breaker maintenance. (H.3 (a)) (Section 1R13)

- Green: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," in that PPL failed to correct a condition adverse to quality in a timely manner. Specifically, PPL failed to replace the emergency service water (ESW) pump electropneumatic time delay relays with a design that would comply with design analysis and Technical Specification (TS) criteria. PPL entered the issue into their corrective action program CAP.

  This finding is more than minor because it affected the equipment performance attribute of the Mitigating System cornerstone and the associated cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding in accordance with IMC 0609 Attachment 4, Phase 1 – "Initial Screening and Characterization of Findings," Table 4a. This finding was of very low safety significance because it did not represent an actual loss of safety function. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because PPL did not take appropriate corrective actions to address an adverse trend in a timely manner (P.1 (d)). Specifically, PPL had a history of sequence timer failures without corrective actions to ensure TS criteria and design analysis compliance for a full testing interval.

- Green: The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," in that PPL failed to identify and properly correct a condition adverse to quality (CAQ). Specifically, PPL failed to recognize the "B" control structure chiller (CSC) trip from May 12, 2010, as a CAQ and did not replace the refrigerant low-temperature cutout switch (RLTCS) despite previous operating experience (OE) demonstrating that the RLTCS experienced setpoint drift following calibration. As an immediate corrective action, PPL entered this NCV into their CAP in addition to replacement of the switch.

This finding is more than minor because it affects the equipment performance attribute of the Mitigating System cornerstone and the associated cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding in accordance with IMC 0609 Attachment 04, Phase 1 – "Initial Screening and Characterization of Findings," Table 4a. This finding was of very low safety significance because it did not represent an actual loss of safety function. The inspector determined that this violation has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, in that PPL failed to properly evaluate the problem and its significance and failed to properly classify and prioritize a CAQ (P.1(c)). Specifically, PPL did not classify the initial failure as a CAQ because it occurred during post-maintenance testing PPL failed to recognize the potential for the RLTCS to affect the operability of a safety-related component despite prior operating experience with the RTLCS and current PM guidance. As a result, the RLTCS was not replaced leading to a subsequent "B" CSC trip on June 28, 2010. (Section 1R19)

Licensee Identified Violations

A violation of very low safety significance, identified by PPL, was reviewed by the inspectors. Corrective actions taken or planned by PPL have been entered into PPL's CAP. This violation and a corrective action tracking number 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 in a refueling outage. A reactor startup was commenced on April 16. Two Division II IRMs failed with reactor power in the intermediate range and all rods were re-inserted. A reactor startup was commenced on April 17 after repairs to one of the IRMs. The repaired IRM failed at the same power level in the intermediate range and all rods were re-inserted and the unit was taken to Mode 3. A reactor startup was commenced on April 18 after repairs to both Division II IRMs. On April 22, the unit synchronized to the grid.

During subsequent integrated control system (ICS) testing on April 18, Unit scrammed on low reactor vessel level. On April 24, a reactor startup was commenced. Unit 1 reached its previously authorized power level of 94.4 percent reactor thermal power (RTP) on May 11.

On May 14, Unit 1 scrammed on turbine control valve fast closure due to a high reactor vessel level during a condensate pump trip (CPT) test required as part of an extended power uprate (EPU) license condition. On May 16, a reactor startup was commenced. Unit 1 reached 94.4 percent on May 20.

On May 27, Unit 1 was reduced to 64 percent RTP as an expected response to a CPT test. The unit reached 94.4 percent on May 29, reached 97.5 percent RTP on May 31 and 100 percent RTP on June 5. On June 25, Unit 1 was reduced to 67 percent over 30 hours for a control rod sequence exchange. Unit 1 remained at full licensed RTP for the remainder of the inspection period.

Unit 2 began the inspection period at the authorized licensed power level of 94.4 percent RTP. On April 16, power was reduced to 65 percent RTP to conduct repairs on the 2C feedwater heater. The unit was shutdown to Mode 3 from this power on April 22 based on elevated offgas flow due to air leakage from the heater. Following repairs, a reactor startup was commenced on April 24. The unit reached 94.4 percent RTP on May 2. On June 18, power was reduced to 65 percent RTP for scram time testing and a rod pattern adjustment over 26 hours. Unit 2 remained at 94.4 percent RTP for the remainder of the inspection period.

Note: The licensed RTP for both units is 3952 megawatts thermal. The Extended Power Uprate (EPU) License Amendment for SSES was approved in January 30, 2008 and was implemented for both units in accordance with the issued license conditions. For the purposes of this report and the remainder of the current operating cycle, the authorized power level for Unit 1 is 100 percent of the EPU licensed power limit. For the current operating cycle, the authorized power level for Unit 2 is 94.4 percent of the EPU licensed power limit.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Summer Readiness of Offsite and Alternate AC Power Systems (71111.01 - 1 sample)

a. Inspection Scope

The inspectors reviewed the features and procedures for operation and continued availability of offsite alternating current (AC) power systems and onsite alternate AC power systems to the plant. The inspectors also reviewed communication protocols between the site and the transmission system operator.

- Summer readiness of offsite and alternate AC power systems.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Walkdown (71111.04Q - 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns to verify system and component alignment and to identify any discrepancies that would impact system operability. The inspectors verified that 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. Documents reviewed are listed in the Attachment. The walkdowns included the following systems:

- Unit 1, containment atmosphere control;
- Unit 1, reactor core isolation cooling (RCIC), 24 VDC, ICS, and drywell ventilation during reactor startup;
- Unit 2, residual heat removal service water (RHRSW) Division I; and
- Common, ESW Division I during ESW Division II outage window.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Protection – Tours (71111.05Q - 6 samples)

a. Inspection Scope

The inspectors reviewed PPL's fire protection program to evaluate the specified fire protection design features, fire area boundaries, and combustible loading requirements for selected areas. The inspectors walked down these 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. The inspected areas included:

- Unit 1, cable spreading room fire zone 0-25E;
- Unit 1, Divisions I and II switchgear room, 749' elevation, Fire zones 1-5G and 1-5F;
- Unit 2, RCIC pump room, Fire Zone 2-1D, CS pump room "A", Fire Zone 2-1B, CS pump room, Fire Zone 2-1A, high pressure coolant injection (HPCI) pump room, Fire Zone 2-1C;
- Unit 2, Divisions I and II switchgear room, 749' elevation, Fire Zones 2-5G and 2-5F;
- Common, diesel fire pump room, Fire Zone 0-72B, 0-72C; and
- Common, control room and soffits, Fire Zone 0-26H, 0-26N, and 0-26P.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

.1 Resident Inspector Quarterly Review (71111.11Q – 1 sample)

a. Inspection Scope

On May 5, 2010, the inspectors observed as-found licensed operator simulator performance. The inspectors compared their observations to Technical Specifications (TSs), emergency plan implementation, and the use of system operating procedures. The inspectors also evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. Documents reviewed are listed in the Attachment. The following training was observed:

- Loss of vacuum, LOCA with HPCI OOS, and event declaration.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 – 3 samples)

a. Inspection Scope

The inspectors evaluated PPL's work practices and followup corrective actions for selected structures, systems and components (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 those 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. Documents reviewed are listed in the Attachment. The following systems were reviewed:

- Unit 1, historic 1D IRM performance;
- Unit 1, RCIC lube oil cooler water supply valve overhaul; and
- Common, Maintenance Rule Periodic Assessment per 10 CFR 50.65(a)(3).

b. Findings

Introduction: A self-revealing, Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," occurred when PPL failed to correct a condition adverse to quality associated with the 1D IRM.

Description: The IRMs comprise a safety-related system that consists of eight channels with four channels in each trip system. This arrangement allows one of four channels in each group to be bypassed without compromising intermediate range neutron monitoring. The IRM system provides input to reactor protection system (RPS) to respond to reactivity excursion events. Per TS Bases 3.3.1.1, Function 1.a, six channels with three channels in each trip system are required for IRM operability to ensure that no single instrument will preclude a scram from this function on a valid signal.

On the evening of April 16, 2010, PPL commenced a reactor startup on Unit 1 from a refueling outage. During control rod withdrawal, the 1H IRM failed to indicate on-scale on range 1 of the Intermediate Range and was taken to the bypass position. An hour and a half after reaching the Point of Adding Heat (POAH), the 1D IRM failed downscale on range 8 resulting in a rod block and alarm. Operators took 1D to range 7 where the IRM again failed downscale. Operators then took 1D to range 6 where the IRM went upscale resulting in a half-scram signal to the RPS. PPL conducted troubleshooting of the 1D and 1H IRM drawers and entered TS 3.3.1.1, Condition A at 0309 on April 17, because both IRM 1D and 1H are in the same trip system. The action statement directs the inoperable channel or trip system to be placed in trip in 12 hours. By 6:33 a.m., on April 17, 2010, PPL had re-inserted all control rods and remained in Mode 2.

Troubleshooting on both IRMs was performed later that day. A time domain reflectometry (TDR) test on the 1H IRM revealed an open circuit under the reactor vessel that was then confirmed visually and attributed to cable damage from carousel rotation. System engineering suspected the 1D pre-amplifier was the cause of its failure and a TDR that bypasses the pre-amplifier revealed a satisfactory signal path between the detector and the drawer. Based on this, PPL concluded the 1D pre-amplifier was the suspect component. System engineering recommended replacing the 1H IRM cable and the 1D IRM pre-amplifier. However, based on not incurring additional time and radiation exposure concerns, PPL decided to only replace the 1D IRM pre-amplifier while maintaining the 1H IRM in its bypassed condition as permitted by TSs. At 9:48 p.m. on 4/17 PPL exited the TS 3.3.1.1.

At 9:48 p.m. on April 17, PPL exited the TS 3.3.1.1. and PPL commenced a second reactor startup on Unit 1. After reaching the POAH, the 1D IRM went downscale momentarily on range 7 and recovered. PPL evaluated the behavior as being consistent with operation of a newly installed pre-amplifier and continued with control rod withdrawal and plant heat-up. At 2:40 a.m., on April 18, with the 1D IRM on range 8, it failed downscale. Operators took 1D to range 7 where the IRM again failed downscale.

Operators then took 1D to range 6 where the IRM went upscale resulting in a half-scram. The shift manager declared the ID IRM inoperable at 2:41 am directed a manual shutdown of Unit 1 and subsequently the unit entered Mode 3 at 6:02 a.m., completing the TS action statement. PPL then replaced the 1D and 1H undervessel cables as well as the 1D IRM detector.

GE Service Information Letter (SIL) 564, "Verification of SRM, IRM or LPRM Detector Response," Revision 1, issued December 3, 2003, addresses off-normal response of neutron monitoring channels during reactor startups. It states that the status of a "detector may be determined by measuring the current versus applied voltage" and recommends that this test, TDRs, and insulation resistance testing be performed on potentially affected neutron monitoring systems before startup from any outage that included undervessel activities. The vendor states that "virtually all of the conditions causing the unsatisfactory operation could have been identified and corrected prior to reactor startup." The inspectors noted that while PPL's review of this SIL noted applicability, it did not state how the site was vulnerable to the situation, what lessons were to be learned, and whether any corrective actions should be taken.

The inspectors also noted that the 1D IRM had exhibited the same behavior during the post-refuel reactor startup in 2008, it had been in bypass during the entire 1R15 cycle, and troubleshooting was performed during the 2010 outage. It was noted, that at the time of the outage troubleshooting, instrument and control (I&C) technicians identified an abnormal TDR trace that curved downward at end of the curve and questioned whether detector replacement was necessary.

Based on the GE SIL, interviews, and a review of the troubleshooting plan for the 1D IRM, the inspectors found that the only potential cause formally considered after the first shutdown was the pre-amplifier. After the second failure, additional components and failure mechanisms were added to the list which included the detector itself. The inspectors also noted that if the SIL-recommended, pre-startup TDR had been conducted on the 1H IRM, its degraded condition would likely have been discovered.

Analysis: The inspectors determined that the cause of the 1D IRM failure was a condition adverse to quality and that the failure to correct this condition prior to commencing another reactor startup was a performance deficiency. This performance deficiency was reasonably within PPL's ability to foresee and prevent. The finding was more than minor since it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the reliability and capability of the IRM system was impacted by the 1D IRM failure. In accordance with IMC 0609, Attachment 4, Phase 1 – "Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding was not a design or qualification deficiency, did not represent a loss of a system/train safety function, and did not screen as potentially risk significant due to external events.

This finding had a cross-cutting aspect in the area of Human Performance, Decision Making, in that PPL did not use conservative assumptions in decision making [H.1(b)]. Specifically, PPL did not consider other failure mechanisms as possible causes for the 1D IRM's degraded condition and adopted a troubleshooting approach of proving an expectation vice disproving all other possible causes.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" states, in part, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations and non-conformances are promptly identified and corrected." Contrary to the above, on April 16 and 17, 2010, PPL failed to correct a condition adverse to quality associated with the 1D IRM prior to a second reactor startup resulting in its failure and the aggregate of two IRMs inoperable in the same trip system. Because the finding was of very low safety significance and because it was entered into PPL's CAP (1259579), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000387/2010003-01, Failure to Correct IRM Condition Adverse to Quality)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 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 Part 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 specified and appropriate risk management actions were identified.

The inspectors reviewed scheduled and emergent work activities with licensed operators and work-coordination personnel to evaluate 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 evaluate whether the compensatory measures identified by the risk assessments were appropriately performed. Documents reviewed are listed in the Attachment. The selected maintenance activities included:

- Unit 1, dual unit yellow risk during Division II LOOP/LOCA testing;
- Unit 1, breaker maintenance on feeder breaker 1A10204 not modeled;
- Common, dual unit yellow risk during Division I ESW schedule outage window;
- Common, yellow risk during T10 outage; and
- Common, elevated LERF risk during 2A RHRSW maintenance.

b. Findings

Introduction: The inspectors identified a self-revealing, Green NCV of 10 CFR 50.65(a)(4) for PPL failing to conduct an adequate risk assessment of online maintenance activities on April 22, 2010. A maintenance activity that caused the 11B bus tie supply feeder breaker from the startup transformer (Breaker 1A10204) to be inoperable was not modeled in the EOOS risk model despite being commenced. When the maintenance activity was properly modeled it resulted in plant risk being reclassified from Green to Yellow.

Description: On April 22, 2010, PPL failed to properly evaluate online risk for a maintenance evolution which made the 11B bus tie supply feeder breaker from the startup transformer (Breaker 1A10204) inoperable. This activity was not modeled in the EOOS risk model for April 22, and when the activity was properly modeled, EOOS risk was reclassified from Green to Yellow due to a tenfold increase in the core damage factor.

This error was identified following a reactor scram which occurred that same day during a transient related to ICS acceptance testing. During this scram, the 11B bus was lost due to the 1A10204 breaker being tagged out, resulting in the "B" condensate, "B" reactor recirculation, "B" circulating water, and "B" service water pumps being de-energized, as well as six non-essential load centers. This resulted in the "B" and "C" RFPTs tripping on low suction pressure and the reactor vessel going into single loop operations. The conditional core damage probability for this reactor scram increased by a factor of 10 due to the partial loss of feed and single loop operations.

It was later identified that the 1A10204 breaker work had been originally scheduled for April 18, right after breaker closure. However, as the outage schedule shifted, this work was taken out of the schedule for April 18 and moved to April 21. The work was released on April 21, 2010 at 10:00 p.m., but the EOOS risk profile was never updated to reflect this work. In accordance with NDAP-QA-1902, "Maintenance Rule Risk Assessment and Management Program," Revision 2, additional actions and reviews would have occurred when plant risk was calculated to be Yellow. Additionally, the opportunity to question whether conducting this maintenance activity during an evolution with a higher than normal plant trip risk (initial post modification ICS acceptance testing) was missed.

PPL entered this issue into their CAP as CR 1257775 to document this issue and to conduct an evaluation. This evaluation will also include a number of other examples where the plant had identified that risk evaluations were not performed including a Unit 2 ESW/RHRSW functional test and Unit 2 service water pump work. In each of these cases, plant risk remained Green, however, the examples indicate an emerging trend in the work planning and risk evaluation areas.

Analysis: Failing to ensure plant maintenance activities were properly modeled and evaluated for online plant risk is a performance deficiency, was reasonably within PPL's ability to foresee and prevent, and is a violation of 10 CFR 50.65 (a)(4). This violation affected the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The item is similar to example 7.e. in NRC IMC 0612 Appendix E, "Examples of Minor Issues." This example states, in part, that failure to perform an adequate risk assessment when required by 10 CFR 50.65 (a)(4) is not minor if the overall elevated plant risk would put the plant into a higher licensee established risk category. In this case, plant risk was reclassified from Green to Yellow when the maintenance was properly modeled; therefore, the violation is more than minor. The inspectors evaluated the finding using IMC 0612 Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Since the incremental core damage probability deficit was less than 1 E-6 and incremental large early release probability deficit was less than 1 E-7, this finding is determined to be of very low safety significance (Green).

This finding was determined to have a cross-cutting aspect in the area of Human Performance, Work Control. PPL failed to appropriately plan work activities by not incorporating risk insights associated with breaker maintenance. (H.3 (a))

Enforcement: 10 CFR 50.65 (a)(4) states, in part, before performing maintenance activities, PPL shall assess and manage the increase in risk that may result from the proposed maintenance activity. Contrary to the above, from April 21 – 22, 2010, PPL failed to appropriately assess plant risk for maintenance on the 11B bus tie supply feeder breaker from the startup transformer (Breaker 1A10204) due to not modeling this activity in the day's EOOS risk model. PPL failed to identify this activity, which resulted in an increase in plant risk by a factor of 10, and to take appropriate risk mitigation activities. Because of the very low safety significance of this finding and because the finding was entered into PPL's CAP as CR 1257775, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Manual.
**(NCV 05000387/2010003-02, Failure to Conduct Online Risk Assessment for a Change in Plant Configuration)**.

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 TSs. In addition, the inspectors reviewed the selected operability determinations to evaluate whether the determinations were performed in accordance with NDAP-QA-0703, "Operability Assessments." The inspectors used the TSs, Technical Requirements Manual (TRM), Final Safety Analysis Report (FSAR), and associated Design Basis Documents as references during these reviews. Documents reviewed are listed in the Attachment. The issues reviewed included:

- Unit 1, 1D and 1H IRMs during multiple reactor startups in April, 2010;
- Unit 1, ESW "A" pump LOOP/LOCA sequencing relay timer failure;
- Unit 2, HPCI steam admission valve leakage and degraded start times;
- Unit 2, #4 TCV fast closure;
- Common, spray pond nozzles; and
- Common, "A" Control Structure Chiller automatic initiation relay.

b. Findings

Introduction: The inspectors identified a Green, NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," in that, PPL failed to correct a condition adverse to quality in a timely manner. Specifically, PPL failed to replace the emergency service water (ESW) pump electropneumatic time delay relays with a design that would comply with design analysis and TS criteria. This is a long term issue dating back to 2002. In 2008, the NRC issued NCV 05000388/2008003-01; however, PPL failed to take timely corrective actions to prevent an additional failure in 2010.

Description: On May 10, 2010, during the performance of the Unit 1 Division I emergency diesel generator (EDG) LOOP/ LOCA, biennial surveillance test, the "A" ESW pump load sequence timer exceeded the acceptance criteria. The sequence timers appropriately sequence vital electrical loads onto the safeguards 4kV buses to avoid EDG frequency and voltage values that adversely affect load performance during a LOOP/LOCA event.

At least one ESW pump sequence timer has failed each biennial surveillance since 2002. In 2006, all four ESW pump timers failed the test criterion. After the failures in 2006, PPL changed the "A" and "D" ESW pump timer from a 0 to 300 second adjustable band relay to one with a 5 to 50 second adjustable band in order to increase set point setting accuracy. In 2008, PPL was issued an NCV for failure to correct this condition adverse to quality (NCV 05000388/2008003-01). Specific to that finding, the corrective actions associated with the degraded sequence timers did not sufficiently assure proper timer operation through one complete two-year surveillance interval. Following the failures in 2008 and the NCV, PPL initiated a series of corrective actions to include finding a suitable replacement for the installed sequence timers. A replacement was identified in May 2008 and samples were bench tested satisfactorily in July 2009. Immediately prior to the Spring 2010 refuel outage and associated scheduling of the next biennial surveillance, the environmental qualification of the proposed timer was determined to be inadequate and an alternative replacement is now scheduled for September 2010. An in-depth review of corrective actions from the 2008 NCV revealed that PPL evaluated the possibility of conducting interim online testing of the ESW timers between two-year cycles. Engineering determined that while the testing was possible and did not result in increased system unavailability, there was uncertainty as to the effectiveness or benefits of increased testing (AR 1050747). As a result, interim online testing was not performed.

Analysis: The inspectors determined that the repetitive failures of the sequence timer relay to meet design and TS acceptance criteria in 2008 and 2010 was a condition adverse to quality that remained uncorrected. This was considered to be a performance deficiency which was within the licensee's ability to foresee and prevent. Also, failure to replace the ESW time delay relays in a timely manner without interim actions to ensure TSs and design criteria were met is a performance deficiency. Specifically, the use of the time delay relays for ESW pumps leaves the plant vulnerable to unexpected complications during a LOOP/LOCA event. Without actions to assure proper operation of the timers between LOOP/LOCA test intervals, timer reliability is uncertain. This finding is more than minor because it affects the equipment performance attribute of the Mitigating System cornerstone and the associated cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors evaluated the finding in accordance with IMC 0609, Attachment 4, Phase 1 – "Initial Screening and Characterization of Findings" Table 4a. This finding was of very low safety significance because it did not represent an actual loss of safety function. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because PPL did not take appropriate corrective actions to address an adverse trend in a timely manner (P.1 (d)). Specifically, PPL had a history of sequence timer failures without corrective action to ensure TS criteria and design analysis compliance for a full testing interval dating back to 2002. In addition, the

NRC had issued a Green NCV in 2008 on this topic. Not having addressed this problem by 2010 is not considered to be timely corrective actions commensurate with the safety significance.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," states in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected." Contrary to this, PPL failed to promptly correct a condition adverse to quality. Specifically, despite ESW sequence timer failures since 2002 and the issuance of an NCV in 2008, PPL experienced an ESW sequence timer failure in 2010. Corrective actions to install a replacement were not completed and actions to assure proper timer operation through one complete biennial surveillance interval were not performed. Because of the very low safety significance of this finding and because the finding was entered into PPL's corrective action program as CR 1253890, this violation is being treated as an NCV, consistent with Section VI.A.I of the NRC Enforcement Policy. (**NCV 0500387; 388/2010003-03, Failure to Correct Condition With ESW LOOP/LOCA Timer**)

1R18 Plant Modifications

Permanent Plant Modifications (71111.18 - 1 sample)

a. Inspection Scope

The inspectors reviewed a permanent plant modification to determine whether the change 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, TSs, and assessed the adequacy of the safety determination screening and evaluation. The inspectors also assessed configuration control of the change by reviewing selected drawings and procedures to verify whether appropriate updates had been made. The inspectors compared the actual installation to the permanent modification documents to determine whether the implemented change was consistent with the approved documents. The inspectors reviewed selected post-installation test results to verify whether the actual impact of the change had been adequately demonstrated by the test. The following modifications and documents were included in the review:

- Common, ICS, and reactor feedpump turbine (RFPT) speed control.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)

a. Inspection Scope

The inspectors observed portions of post-maintenance test (PMT) activities in the field to determine whether the tests were performed in accordance with the approved procedures. The inspectors assessed the test adequacy by comparing the test methodology to the scope of maintenance work performed. In addition, the inspectors

evaluated acceptance criteria to determine whether the test demonstrated that components satisfied the applicable design and licensing bases and TS requirements. The inspectors reviewed the recorded test data to determine whether the acceptance criteria were satisfied.

The inspectors reviewed PMT activities relating to EPU design changes for the integrated control system and RFPT speed control unit. Specifically, the review included the initial calibration of the integrated control system and the initial testing of the RFPT modifications.

Inspectors evaluated major test procedures for the Unit 1 EPU before the performance of each test to ensure the test could be conducted safely and in accordance with the design and licensing bases. Inspectors directly observed reactivity changes, transient response and reviewed the results of each test to ensure the plant response was as expected. Plant parameters were evaluated for stability and response characteristics. Inspectors validated the EPU Level 1 acceptance criteria were met and that Level 2 acceptance criteria were met or appropriately evaluated.

- Unit 1, digital feedwater modification;
- Unit 1, two RFPTs in auto-flow control mode test;
- Unit 1, EPU condensate pump trip test at 94.4 percent RTP, May 14 and 28;
- Unit 1, EPU electrohydraulic control (EHC) pressure regulator testing and main turbine control valve testing, June 4;
- Unit 2, emergency switchgear cooling following relay setpoint changes;
- Common, station portable DG annual run following scheduled maintenance; and
- Common, "B" control structure chiller following outage window.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," in that PPL failed to identify and properly correct a condition adverse to quality (CAQ). Specifically, PPL failed to accurately classify the "B" control structure chiller (CSC) trip on May 12, 2010, as a CAQ and did not replace the refrigerant low temperature control switch (RLTCS).

Description: The control structure chilled water system is designed to supply chilled water at 44°F to the control room floor cooling system, control structure heating, ventilation and air-conditioning (HVAC), control room emergency outside air supply, system and emergency switchgear room cooling. During normal operations, the system runs with one chiller in service and the other in standby which automatically starts on a running chiller failure. If the running chiller fails, the standby chiller starts automatically. The system is required to operate during all modes of plant operation.

On May 12, 2010, PPL conducted a post maintenance testing (PMT) on the "B" CSC after a scheduled system outage window that did not include any work on the RLTCS. Thirteen minutes into testing, the "B" CSC tripped and the cause was attributed to the RLTCS drifting from 33°F to 41.7°F. PPL entered the trip into the CAP (CR 1262646) and documented the event as a condition not adverse to quality (NCAQ) because the failure occurred during a PMT. The associated work order to investigate the issue did not include any operational experience (OE) considerations related to RLTCS failures.

PPL recalibrated the switch to 33°F despite the current preventive maintenance scope which no longer calibrates the switch, instead the switch is replaced every 12 years. In addition, no action was assigned to verify the calibration of the RLTCS on the "A" CSC as part of any extent of condition review.

While reviewing previous chiller trips, the inspectors identified that, on November 18, 2005, PPL performed a calibration of the Unit 1 "B" turbine building (TB) chiller to 33.5°F. Four days later, the Unit 1 TB chiller tripped on low refrigerant temperature at 40.5°F.

PPL concluded that RLTCS calibration could potentially affect its reliability and subsequently changed the RLTCS preventive maintenance scope to the 12 year replacement previously discussed. The TB chillers and CSCs are made by the same manufacturer with the same RLTCS with the exception that the CSC RLTCS part has a quality certification due to the supported system's safety-related function. The preventive maintenance scope change affected both chiller systems.

Inspectors questioned why CR 1262646 was not classified as a CAQ. PPL stated the failure had occurred during a PMT on an inoperable component and CAQ guidance in NDAP-QA-0702, "Action Request and Corrective Report Process," Revision 27, did not apply. Attachment D of this document cites, as a CAQ example, "equipment degradation that could prevent a quality related or risk significant system or component from performing its safety-related or safe shutdown function." The example is for any equipment degradation that could affect safety-related equipment from being operable or performing its safety function. Further, component failures not covered by the scope of performed maintenance are still considered a failure that could prevent a safety system from performing its safety-related function therefore being a CAQ. Therefore, the inspectors concluded that the failure of the "B" CSC in May 2010 was a CAQ. The level of evaluation and prioritization of corrective actions is effected by whether or not an issue is designated a CAQ or not.

On June 28, 2010, the "B" CSC tripped again on low refrigerant temperature. CR 1275573 was generated for this trip and was correctly classified as a CAQ. PPL found the RLTCS setting at 47.7°F, replaced the switch during 38 hours of unavailability, and tested the CSC satisfactorily. The inspectors concluded that PPL had prior operating experience that showed that RLTCS reliability could be affected after calibration and that calibration of the RLTCS following the May 2010 failure was inadequate and not in agreement with the current preventive maintenance scope of replacement. This is considered to be a performance deficiency which was within PPL's ability to foresee and prevent due to the 2005 Internal OE and PM program in place for these switches.

Analysis: Failure to identify and properly correct a CAQ in accordance with 10 CFR 50 Appendix B, Criterion XVI, after the trip of the "B" CSC on May 12, 2010, and inadequate corrective actions contributed to the subsequent June 28, 2010 trip of the same CSC. This is considered a performance deficiency within PPL's ability to foresee and prevent. Specifically, PPL did not classify CR 1262646 as a CAQ as it was associated a PMT and performed inappropriate corrective actions without considering prior OE and current maintenance scope guidance which led to the June 28 trip of the "B" CSC. RLTCS setpoint drift problems could affect the 30 day mission time of the CSCs after a design basis accident. This finding is more than minor because it affects the equipment performance attribute of the Mitigating System cornerstone and the associated

cornerstone objective of ensuring the reliability and availability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors evaluated the finding in accordance with IMC 0609 Attachment 04, Phase 1 – "Initial Screening and Characterization of Findings." This finding was of very low safety significance (Green) because it did not represent an actual loss of safety function. The inspectors determined that this violation has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, in that PPL failed to properly evaluate the problem and its significance and failed to properly classify and prioritize a CAQ (P.1(c)). Specifically, PPL did not classify CR 1262646 as a CAQ because it occurred during post-maintenance testing. PPL failed to recognize the potential for the RLTCS to affect the operability of a safety-related component despite prior operating experience with the RTLCS and current PM guidance. As a result, the RLTCS was not replaced, leading to the subsequent trip of the "B" CSC on June 28, 2010 and an additional 38 hours of extra unavailability of a safety-related equipment.

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, states in part, "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected." Contrary to the above, PPL failed to classify the event of May 12, 2010, as a CAQ, failed to properly correct the condition, and failed to include consideration of OE indicating that the RLTCS was unreliable after calibration. This led to the June 28, 2010 trip of the same CSC. Because this violation was of very low safety significance and it was entered into PPL's CAP as CR1266476, this violation is being treated as an NCV, consistent with Section VI.A.I of the NRC Enforcement Policy. (**NCV 05000387; 388/2010003-04, Failure to Correct Condition Adverse to Quality**)

1R20 Refueling and Other Outage Activities (71111.20 – 2 samples)

.1 Unit 1 Refuel Outage (RFO)

a. Inspection Scope

The Unit 1 RFO (1R16) was conducted from March 2 through April 22, 2010. During the outage and through reactor startup, as appropriate, inspectors performed the activities below to verify PPL's controls over outage activities:

- Outage Plan – reviewed the outage risk plan and work schedules for staff on both the operating unit and the shutdown unit;
- Shutdown activities – monitored the shutdown, cooldown, and transfer to the shutdown cooling mode of decay heat removal;
- Outage activity control – monitored or verified the following:
  1) Clearance activities;
  2) RCS Instrumentation;
  3) Electrical power;
  4) Decay heat removal and spent fuel pool cooling;
  5) Inventory and reactivity control;
  6) Containment closure;
  7) Fatigue management;

- Drywell and suppression chamber - walkdowns after shutdown;
- Refueling activities – independent review of core alterations;
- Monitoring of Heatup and Startup Activities;
- Implementation of EPU testing plan; and
- Identification and Resolution of Problems – reviewed corrective action program (CAP) entries to verify an adequate threshold for issues and appropriate corrective actions.

During the conduct of the refueling inspection activities, the inspectors reviewed the associated documentation to ensure that the tasks were performed safely and in accordance with plant TS requirements and operating procedures.

b. Findings

No findings of significance were identified.

.2 Unit 2 Forced Outage

a. Inspection Scope

A Unit 2 forced outage was conducted from April 22 through 26, 2010. Unit 2 conducted a planned maintenance shutdown in accordance with their Operating Decision Making Checklist for a tube leak in the Unit 2 C feedwater heater. The inspectors observed the plant shutdown, maintenance, inspection, and radiological controls activities associated with the repair of the 2C feedwater heater. The inspectors viewed PPL's boroscope inspection tapes of the feedwater heater and reviewed PPL's damage evaluation and repair assessment including the number of tubes to be plugged and an assessment of the heat exchanger's capacity in the as left condition. The inspectors also observed the PMT for the heat exchanger, plant startup activities, and observed the thermal performance upon being placed in service. During the outage and through reactor startup, as appropriate, inspectors performed the activities below to verify PPL's controls over outage activities:

- Unit 2, forced outage for 2 "C" feedwater heater (FWH) repairs.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 – 4 routine surveillances, 1 IST, and 1 RCS Leak Detection samples)

a. Inspection Scope

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

- Unit 1, reactor coolant pressure boundary leak test (RCS);
- Unit 1, 24 month HPCI flow verification;
- Unit 2, HPCI lube oil functional test;
- Unit 2, quarterly Standby Liquid Control (SLC) flow verification PMT;
- Unit 2, HPCI quarterly valve cycling surveillance and Inservice Testing (IST); and
- Common, monthly "E" EDG surveillance run.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06 - 1 sample)

a. Inspection Scope

The inspectors reviewed the combined functional drill scenario and observed selected portions of the drill in the emergency operations facility. The inspection focused on PPL's ability to properly conduct emergency action level (EAL) classification, notification, and protective action recommendation activities and on the evaluators' ability to identify observed weaknesses and/or deficiencies within these areas. Ten performance indicator (PI) opportunities were included in the scenario.

The inspectors attended the post-drill critique and compared identified weaknesses and deficiencies including missed PI opportunities against those identified by PPL to determine whether PPL was properly identifying weaknesses and failures in these areas. The drill evaluation sample included:

- Common, Emergency Preparedness (EP) Drill (White Team), June 10, 2010.

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

Cornerstone: Occupational/Public Radiation Safety (PS)

2RS5 Radiation Monitoring Instrumentation (71124.05 – 1 partial sample)

a. Inspection Scope

PPL's program was evaluated against the requirements contained in the Susquehanna Off-Site Dose Calculation Manual (ODCM) for the calibration and maintenance of radiation monitoring equipment utilized in measuring plant effluents.

Walkdowns and Observations

The inspectors walked down effluent radiation monitoring systems, including liquid and gaseous system. The inspectors verified that effluent/process monitor configurations align with ODCM descriptions.

Process and Effluent Monitors

The inspectors verified that channel calibration and functional tests were performed consistent with radiological effluent technical specifications (RETS)/ODCM. The inspectors verified that (a) PPL calibrated its monitors with National Institute of Standards and Technology (NIST) traceable sources, (b) if a primary calibration, it adequately represented the plant nuclide mix, (c) if a secondary calibration, it verified the primary calibration, and (d) the channel calibrations encompassed the instrument's alarm setpoints.

The inspectors verified that effluent monitor alarm setpoints were established as provided in the ODCM and station procedures. For changes to effluent monitor setpoints, the inspectors evaluated the basis for changes to ensure that an adequate justification exists.

b. Findings

No findings of significance were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06 – 1 sample)

a. Inspection Scope

PPL's program was evaluated against the requirement to provide adequate protection of the public from effluent releases resulting from normal operations of the plant by maintaining the dose to the maximally exposed member of the public as far below the dose limits in 10 CFR Part 20 and 40 CFR Part 190, as is reasonably achievable (ALARA). 10 CFR Part 50, Appendix A, Criterion 60 requires the control and appropriate mitigation of radioactive materials released as plant effluents. In addition, Paragraph 50.34a, and the associated 10 CFR Part 50, Appendix I provide dose based design criteria to ensure the effectiveness of plant effluent processing systems in maintaining effluent releases to the plant environs ALARA.

Event Report and Effluent Report Reviews

The inspectors reviewed the Radiological Effluent Release Reports issued since the last inspection. The inspectors determined that the reports were submitted as required by the ODCM/Technical Specifications. The inspectors identified radioactive effluent monitor operability issues reported by PPL as provided in effluent release reports, and determined that the issues were entered into the corrective action program and adequately resolved.

ODCM and FSAR Reviews

The inspectors reviewed changes to the ODCM made by PPL since the last inspection, against the guidance in NUREG-1301, 1302 and 0133, and Regulatory Guides 1.109, 1.21 and 4.1. The inspectors determined that PPL had not identified any non-radioactive systems that had become contaminated as disclosed either through an event report or are documented in the ODCM since the last inspection.

Groundwater Protection Initiative (GPI) Program

The inspectors reviewed reported groundwater monitoring results, and changes to PPL's written program for identifying and controlling contaminated spills/leaks to groundwater.

Procedures, Special Reports and Other Documents

The inspectors reviewed PPL's event reports, and/or special reports related to the effluent program issued since the previous inspection. The inspectors identified no additional focus areas for the inspection based on the scope/breadth of problems described in these reports. The inspectors reviewed effluent program implementing procedures, particularly those associated with effluent sampling, effluent monitor set point determinations, and dose calculations.

Walkdowns and Observations

The inspectors walked down selected components of the gaseous and liquid discharge systems to verify that equipment configuration and flow paths align with the documents, and reviewed and assessed equipment material condition. For equipment or areas associated with the systems selected above that were not readily accessible due to radiological conditions, the inspectors reviewed PPL's material condition surveillance records. The inspectors walked down those filtered ventilation systems whose test results were reviewed during the inspection. The inspectors verified that there were no conditions, such as degraded high-efficiency particulate air (HEPA)/charcoal banks, improper alignment, or system installation issues that would impact the performance, or the effluent monitoring capability of the effluent system. The inspectors determined that PPL had not made any significant changes to its effluent release points.

The inspectors observed the routine processing and discharge of effluents (including sample collection and analysis). The inspectors verified that appropriate effluent treatment equipment was being used and that radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligns with discharge permits.

Sampling and Analyses

The inspectors selected effluent sampling activities and verified that adequate controls had been implemented to ensure representative samples are obtained (e.g. provisions for sample line flushing, vessel recirculation, composite samplers, etc.). The inspectors determined that the facility was not routinely relying on the use of compensatory sampling, in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection.

The inspectors reviewed the results of the inter-laboratory comparison program to verify the quality of the radioactive effluent sample analyses. The inspectors verified that the inter-laboratory comparison program include had-to-detect isotopes as appropriate.

Instrumentation and Equipment

The inspectors reviewed the methodology that PPL uses to determine the effluent stack and vent flow rates. The inspectors verified that the flow rates were consistent with RETS/ODCM or FSAR values, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

The inspectors verified that surveillance test results since the previous inspection for Technical Specification required ventilation effluent discharge systems (HEPA and charcoal filtration) meet TS acceptance criteria.

Dose Calculations

The inspectors reviewed radioactive liquid and three gaseous waste discharge permits. The inspectors verified that the projected doses to members of the public were accurate and based on representative samples of the discharge path. The inspectors evaluated the methods used to determine the isotopes that are included in the source term to ensure all applicable radionuclides were included, within detectability standards. The inspectors reviewed the current Part 61 analyses to ensure hard-to-detect radionuclides were included in the source term.

The inspectors reviewed changes in PPL's offsite dose calculations since the last inspection. The inspectors verified that the changes were consistent with the ODCM and Regulatory Guide 1.109. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate factors were being used for public dose calculations. The inspectors reviewed the latest Land Use Census and verified that changes have been factored into the dose calculations.

Groundwater Protection Initiative (GPI) Implementation

The inspectors verified that PPL was continuing to implement the voluntary NEI/Industry GPI since the last inspection. The inspectors reviewed monitoring results of the GPI to determine if PPL had implemented its program as intended, and to identify any anomalous results. No anomalous results were identified.

The inspectors reviewed identified leakage or spill events and entries made into 10 CFR 50.75 (g) records. The inspectors reviewed evaluations of leaks or spills, and review any remediation actions taken for effectiveness. The inspectors reviewed onsite contamination events involving contamination of ground water.

The inspectors verified that onsite ground water sample results and a description of any significant onsite leaks/spills into ground water for each calendar year were documented in the Annual Radiological Environmental Operating Report (AREOR) for REMP or the Annual Radiological Effluent Release Report (ARERR) for the RETS.

Problem Identification and Resolution

The inspectors verified that problems associated with the effluent monitoring and control program were being identified by PPL at an appropriate threshold and were properly addressed for resolution in the licensee corrective action program.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

### 4OA1 Performance Indicator (PI) Verification

.1 Mitigating Systems (71151 – 4 samples)

a. Inspection Scope

The inspectors reviewed PPL's PI data for the period of September 2009 through March 2010 to determine 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, "Regulatory Assessment Performance Indicator Guideline." The following performance indicators were included in this review:

- Units 1 and 2, safety system functional failures (MS05);and
- Units 1 and 2, high pressure injection systems (MS07).

b. Findings

No findings of significance were identified.

.2 Barrier Integrity (4 samples)

a. Inspection Scope

The inspectors reviewed PPL's PI data for the period of June 2009 through June 2010 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, "Regulatory Assessment Performance Indicator Guideline" and PL-NF-06-002, "SSES Mitigating System Performance Index Basis Document," Revision 4. The following performance indicators were included in this review:

- Units 1 and 2 Reactor Coolant System (RCS) activity (BI01); and
- Units 1 and 2 RCS identified leak rate (BI02).

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 – 2 sample)

.1 Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As specified by Inspection Procedure (IP) 71152, "Identification and Resolution of Problems," (PI&R), and in order to help identify risk significant, repetitive, long-term or latent equipment failures, cross-cutting components or adverse performance trends for followup, the inspectors performed screening of all items entered into PPL's CAP. This was accomplished by reviewing the description of each new CR, attending management committee meetings, and viewing computerized CAP entries.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Review to Identify Trends (1 sample)

a. Inspection Scope

As required by IP 71152, "Identification and Resolution of Problems," the inspectors performed a review of PPL's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1. The review also included issues documented outside the normal CAP in corrective maintenance work orders (WOs), component status reports, site monthly meeting reports, and maintenance rule assessments. The inspectors' review concentrated on the six month period of December 2009 through June 2010, although some examples expanded beyond those dates when the scope of the trend warranted. Corrective actions associated with a sample of the issues identified in PPL's trend reports were reviewed for adequacy. As part of this sample and in support of the potential Chilling Effect letter (CEL) issued to PPL in January 2009, the inspectors examined issues related to the safety conscious work environment (GWE) at Susquehanna. Specific documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

Assessment and Observations

Energy Control Process

The trend identified in the three previous semi-annual trend reviews (IR 05000387; 388/2009-005, 2009-003 and 2008-005) appears to have been appropriately addressed. There were no Level 1 energy control events and two Level 2 events in the reviewed period as compared to three Level 1 and five Level 2 events in the second half of 2009. PPL completed a root cause analysis (RCA) under CR 1168570 in December 2009 and implemented compensatory

measures that included a senior reactor operator (SRO)-level review of clearance orders, staffing the clearance office with an electrical print subject matter expert, and developing print reading training for clearance holders added as a fundamentals course. At the time of this sample, new or revised energy control processes were also being implemented.

Work Environment

The inspectors reviewed the usage of available programs for raising concerns over the last six months to include metrics from January through April, 2010. The employee concerns program (ECP) has continued to present itself as a viable alternative for employee issues. There was a rise in ECP entries with 68 in the first half of 2010 as compared to 39 entries in the latter part of 2009. Of those issues, there appeared to be an increase in use by supervision which totaled more than a third of the 2010 entries. Regarding the number of monthly, anonymous ARs/CRs, there were 96 in the first half of 2010 with peaks of 32 and 28 in January and March. This shows an approximate 50 percent increase from the average of ten per month in the latter part of 2009.

Anonymous phone hotline use continued to be comparatively low but steady against the anonymous AR/CR process averaging one call per month. Since the last trend review, PPL has incorporated their Work Environment Improvement Plan into their Excellence Plan as a focus area. Station communications remain frequent and are available in multiple media forms to include the intranet, station leadership package, and the Communication Centers around the site. The inspectors concluded that the increased usage of the ECP, continued communications on high visibility topics, and use of the anonymous report process are conducive to continuous improvement of the SCWE at the station.

.3 Assessment of Safety Conscious Work Environment (1 sample)

a. Inspection Scope

Background: On January 28, 2009, the NRC issued a potential CEL advising PPL of concerns related to the SCWE at Susquehanna and requested PPL provide: (1) a description of PPL's current action plans to address existing SCWE concerns to preclude a chilled work environment at Susquehanna; (2) PPL plans for further evaluating the health of the SCWE at Susquehanna; and (3) the metrics PPL intended to monitor to determine the effectiveness of their actions and ensure a SCWE at the Susquehanna site (ML090280115).

Also, on January 28, 2009, the NRC issued Susquehanna Steam Electric Station – NRC Integrated Inspection Report 05000387/2008005 and 05000388/2008005 (ML090230434) which described the SCWE concerns at PPL and provided additional background. PPL completed their formal RCA of the work environment issues in May 2009. The NRC has formally reviewed the RCA, documented in NRC Integrated Inspection Report 05000387/2009003 and 05000388/2009003 (ML092230158), and conducted a review of PPL's progress in implementing corrective actions in the 3rd quarter 2009, documented in NRC Integrated Inspection Report 50-387 & 50-388/2009004 (ML093170275). During the 4th quarter, the NRC reviewed the results of an independent third party safety culture survey performed by Synergy Consulting. This inspection is documented in NRC Inspection Report 50-387 & 50-388/ 2009005 (ML100321652). During the first quarter of 2010, the NRC conducted a biennial PI&R

team inspection which also reviewed the SCWE and the corrective actions taken to address the SCWE. This inspection is documented in NRC Inspection Report 50-387 & 50-388/2010006 (ML100740339)

The inspectors reviewed the SCWE at Susquehanna through conduct of the following activities:

- During approximately 30 interviews with a cross section of Susquehanna personnel, the inspectors questioned individuals regarding: willingness to raise safety concerns, knowledge of the avenues available for raising safety concerns, the effectiveness of actions taken by management to foster a SCWE at the site, and knowledge of individuals who had experienced a negative reaction for raising a safety concern.
- The inspectors reviewed implementation of the site ECP. The inspectors compared the number and type of issues documented in the Susquehanna ECP in 2010 to the number and type of issues documented as Susquehanna NRC allegations for that same period. The inspectors reviewed the site procedure for conducting ECP investigations and reviewed a sample of ECP files to assess the program's effectiveness at addressing potential safety issues. The inspectors also reviewed how the program handled ongoing ECP investigations.
- The inspectors conducted group interviews of various groups across the site including both bargaining unit and management personnel in order to assess SCWE. The inspectors interviewed groups from I&C Maintenance and Security. The results of these group interviews were compared with other group interview results conducted in the 3rd and 4th quarter 2009 PI&R sample.
- With the support of the agency allegation advisor (AAA), inspectors performed monthly conference calls with PPL to review the results of PPL's SCWE metrics. Specifically, metrics from November 2009 through May 2010 were reviewed for trends and evaluated to assess the effectiveness of PPL's actions to ensure a SCWE at the site. The inspectors performed a historical review of the PPL metrics to identify trends and reviewed changes that have been made to PIs and how PI data is collected.

Assessment: Based on interviews, observations of plant activities, and reviews of the CAP and the ECP, the inspectors determined that in general site personnel were willing to identify and raise safety issues. All persons interviewed demonstrated an adequate knowledge of the avenues available for raising safety concerns including CAP and ECP.

At a plant level, PPL made significant progress in addressing SCWE issues at Susquehanna, developed effective means to monitor the work environment through metrics, is using internal and external feedback to revise and improve these metrics, and is using the information from these metrics to revise and enhance the work environment improvement plan. Plant level communications have been enhanced significantly. However, there are specific departments and work groups which have general work environment concerns and require additional attention and resources to ensure a SCWE issue does not develop. PPL has identified emerging work environment issues at an early stage and been proactive in addressing these issues.

Inspection Results

The inspectors' review of the metrics established to monitor SCWE/general work environment (GWE) determined that the metrics were reasonably effective at identifying adverse trends in SCWE/GWE issues and PPL is utilizing these metrics appropriately to check and adjust their plans. The GWE improvement plan has been incorporated in the overall site improvement plan and the SCWE/GWE area continues to receive an appropriate level of management attention and resources. Metrics were reviewed monthly both internally and with the NRC. Several metrics (such as the Operator Aggregate Index) have been adjusted or modified to more effectively capture the data. Other PIs have also been adjusted to provide a forward looking trend assessment. PPL has also used third party reviews from vendors and conducted benchmarking visits to other licensee's to identify how to improve and refine their PIs.

In the 4th quarter of 2009, the NRC reviewed the results of the Safety Culture Survey performed by an external vendor. PPL took the results from this survey and incorporated the findings and observations into their site improvement plans. In addition, each priority 2 and 3 work group performed an internal review. A "deep dive review" was conducted for the Security Department, which was identified as a level 3 watch group in the 2009 Safety Culture security department. This self-assessment was reviewed by the inspectors and was determined to be very self- critical and well-designed.

The security department review identified that a number of the security guards reported that they may be hesitant to raise certain types of issues to a small number of supervisors. Examples included calling out a peer for performance issues, calling out shift security supervisor performance, and scheduling concerns. The inspectors independently interviewed several groups and individuals. All personnel interviewed strongly stated that they would raise a safety, security or equipment issue without hesitation, but some did express that they would raise certain issues to one supervisor over another on their crew or would raise issues via an anonymous CR. The inspector did identify that the number of anonymous CRs related to security area issues (particularly scheduling and work hour related issues) has increased. The inspectors did not conclude that there were security guards who would not raise a direct safety or security concern.

PPL's security deep dive identified a number of issues concerns including scheduling and work hour concerns, training and mentoring opportunities to improve first line supervisor skills, the visibility of security management, and first line supervision in the field. The deep dive and the inspectors' interviews also identified a concern related to resources. PPL remains in compliance with all security-related regulations; however, some security staff have a perception that resource levels could be increased to compensate for recent promotions and transfers. The use of scheduled overtime and callouts has increased and this has the potential to develop into a SCWE issue. There are also some negative perceptions regarding the reliability index which is used in the evaluation process and is perceived to be unfair by many guards.

The inspector also interviewed workers from the maintenance I&C group. This group had shown measurable improved in the Safety Culture survey from 2008 to 2009. The workers interviewed attributed much of this improvement to the I&C management, who have interacted well with the technicians and been successful at communicating to the technicians and sharing long-term plans to improve the I&C group. However, the former I&C Manager was promoted in 2009 and as of June 2010 a permanent manager had not been named. Having a long-term temporary manager has been a challenge for several

groups include I&C and the QA organization in 2009. Perceptions regarding the lack of a long-term vision and the perception that the temporary manager doesn't have the authority to push issues on the technicians behalf could have an impact. The interviews also identified that maintenance groups such as I&C have an internal communications challenge in that both technicians and supervisors rotate to the back shift. As a result, it is not uncommon for a technician to not see his supervisor for an extended period of time. Since many of PPL's communication strategies rely upon information being communicated from the first line supervision to the workers, in organizations such as I&C, these communication strategies may become less effective.

The inspectors also reviewed and assessed the ECP program. The inspectors determined that significant improvements have been made in this area. Over the last two years the ECP program underwent several key personnel and programmatic changes, including the establishment of an ombudsmen and subsequent realignment eliminating the ombudsmen and hiring of a new on-site ECP representative. This new representative has been well received by plant personnel. PPL issued several focused communications informing the plant of the changes and promoting new alternative methods to raise a concern anonymously. As a result, workers appear to be more willing to use the ECP program based upon shifts in the number of ECP cases and NRC allegations.

b. Findings

No findings of significance were identified.

4OA3 Event Followup (71153 – 2 samples)

.1 Susquehanna Unit 1 Reactor Scram on April 22, 2010

a. Inspection Scope

On April 22, 2010, Susquehanna Unit 1 was operating at 32 percent RTP and conducting ICS testing. The 1A RFPT was in flow control (FC) mode injecting feedwater into the reactor vessel while the "1B" and "1C" RFPTs were in the idle mode. All three RFPTs had been tuned in their respective modes during previous steps of TP-145-031, "SAT – ICS Start-up and Tune-up in Condition 1 and 2," Revision 0. During the automatic transition of the "1B" RFPT from idle to FC mode, the reactor vessel experienced a level transient that ultimately resulted in a reactor scram on low reactor water level. The resident inspectors responded to the control room and observed operators taking actions in accordance with procedures and verified the correct plant response. The inspectors reviewed the transient response post-event.

b. Findings

Introduction: An unresolved item (URI) was identified concerning configuration control and operation of the ICS-controlled feedwater and reactor vessel level control system.

Description: On April 22, 2010, during the performance of ICS testing, Unit 1 experienced a level transient and reactor scram on low water level. Historic plant startup sequences maintained the third RFPT on the turning gear, a third condensate pump running, and manual controls to parallel the second RFPT. In contrast, the third RFPT

was in the idle mode and two condensate pumps were running when ICS enabled the "1B" RFPT to transition from idle mode directly to FC mode as designed. PPL was conducting an RCA of the scram event at the end of the inspection period. This issue will be tracked as a URI pending inspection following completion of PPL's RCA. (**URI 05000387/2010003-05, Configuration Control and Operation of ICS**)

.2 Susquehanna Unit 1 Reactor Scram on May 14, 2010

a. Inspection Scope

On May 14, 2010, Susquehanna Unit 1 was operating at 94.4 percent RTP and conducting a CPT test in accordance with TS License Condition 2.C.37(b). Following the condensate pump trip, the reactor vessel experienced a level transient, as expected. However, the ICS system did not respond as expected and resulted in a main turbine trip on high reactor water level and ultimately a reactor scram. A resident inspector was present in the control room during the test and observed both operator and plant response prior to, during, and following the transient.

b. Findings

Introduction: An URI was identified concerning the predicted plant response to large transients using the newly implemented ICS.

Description: On May 14, 2010, during the performance of a condensate pump trip test, Unit 1 experienced a level transient and reactor scram on a main turbine trip. Despite simulator predictions that the ICS would handle the recirculation runback and associated level transient, the ICS did not respond sufficiently. PPL was conducting an RCA of the scram event at the end of the inspection period. This issue will be tracked as a URI pending inspection following completion of PPL's RCA. (**URI 05000387/2010003-06, Predicted Plant Response to Large Transient With ICS**)

4OA5 Other Activities

.1 EPU Major Plant Tests (71004 and 71111.19)

a. Inspection Scope

The inspectors observed portions and reviewed the following major plant tests. The details of these inspection samples are described in 1R19 of this report. Each of the following tests was considered an inspection sample that meets the requirements of IP 71004, paragraph 02.03.e:

- Unit 1, digital feedwater modification PMT;
- Unit 1, two RFPTs in auto-flow control mode test;
- Unit 1, EPU CPT test at 94.4 percent RTP, TP-144-048, May 14, 2010 and May 28, 2010; and
- Unit 1, EPU EHC pressure regulator testing and main TCV testing, TP-193-041, June 4, 2010.
-

b. Findings and Observations

No findings of significance were identified.

.2 EPU Power Ascension (Integrated Plant Evolutions) (71004 and 71111.20)

a. Inspection Scope

Inspectors witnessed power ascension following the Unit 1 refueling outage. Inspectors witnessed portions of all reactivity changes made to achieve specific EPU test conditions and when operators increased reactor power to 97.5 and 100 percent reactor power (3855 and 3952 MWth respectively). Inspectors also reviewed operator actions, procedure adherence, and plant response during these integrated plant maneuvers. Unit 1 reached a reactor power level of 3855 MWth on May 31, 2010 and 3952 MWth on June 05, 2010. Inspectors verified the completion of all EPU license commitments and the evaluation and resolution of all test exceptions.

This was a required sample in accordance with IP 71004 paragraph 02.03.e. The integrated plant startup and power operation procedures reviewed are provided in the Attachment to this report.

b. Findings

No findings of significance were identified.

.3 Follow up of PPL's response to EA-10-055 ,"NRC Resolution of an Allegation of Discrimination"

a. Inspection Scope

On May 27, 2010, the NRC transmitted a letter EA-10-055, "NRC Resolution of an Allegation of Discrimination" to PPL (ML101481040) This letter described the NRC OI investigation into a alleged case of discrimination against a SRO. Although the NRC concluded that the event did not constitute discrimination, the NRC recognized that many people had negative perceptions regarding the event and it had an impact on the SCWE/GWE on site, particularly in the Operations Department. As a result, the NRC requested PPL provide a supplemental response to the NRC describing how either 1) prior corrective actions to address the behaviors of the alleged discrimination event; or 2) additional actions taken or planned to address these behaviors.

PPL responded to the NRC's request in a letter dated June 16, 2010. (ML101730517). This letter described the actions which had been previously taken as part of the corrective actions to address the SCWE/GWE at Susquehanna following the NRC's potential Chilling Effect Letter issued in January 2009 (ML090280115). The NRC has reviewed those actions in detail and a summary of those inspection activities can be found in Section 4OA2.3 of this report. The PPL letter of June 16, 2010 also described additional actions the site has taken or planned since May 27, 2010 for this issue. Those actions included:

- The development and conduct of a "Coaching and Communicating For Results" course to be required for all first line supervisors and above;

- The individual who interacted with the SRO volunteered to share the lessons learned from this event with the Susquehanna Leadership team and other senior level managers.

During the week of June 28, 2010, the inspectors conducted an on-site review of the corrective actions previously taken and the additional actions planned. The inspectors reviewed training course material and interviewed personnel who either took the training or participated in the lessons learned session conducted by the manager involved in this issue. The inspectors also reviewed the site's communication plan used to communicate the NRC letter to site personnel.

b. Findings and Observations

There were no findings of significance.

The inspectors determined that PPL's response and corrective actions were reasonable and appropriate to address the issue. The inspectors determined that actions previously taken to address the NRC's potential Chilling Effects Letter, along with the additional actions provided in the June 16, 2010 letter, were appropriate to address the SCWE/GWE aspects of this event.

Regarding the additional actions, the inspectors reviewed training course material and interviewed personnel who either took the training or participated in the lessons learned session conducted by the manager involved in this issue. The inspector concluded that these actions were well received and effectively addressed the SCWE impacts of the event.

The inspectors also reviewed the site's communication plan and determined that the site had promptly communicated the content of the NRC's letter to its personnel and took responsibility for the manager's actions. The inspectors concluded that these communications and corrective actions appear to have been effective. The NRC does not require any additional information and considers the issue to be closed.

4OA6 Meetings, Including Exit

On May 14, 2010, the inspector presented inspection results to Mr. J. Helsel and other members of his staff. PPL acknowledged the findings.

On July 2, 2010, the inspector presented inspection results to Mr. J. Helsel and other members of his staff. PPL acknowledged the findings.

On July 19, 2010, inspectors presented inspection results to Mr. T. Rausch and other members of his staff. PPL acknowledged the findings. The inspectors verified that no proprietary information is contained in this report.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by PPL and is a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as a non-cited violation:

On April 7, 2010, PPL identified that the reactor cavity letdown piping in the "A" core spray pump room (Unit 1 reactor building, 645 foot elevation) had dose rates that exceeded 100 mR/hr at 30 centimeters, but the area was not posted and barricaded in accordance with TS 5.7. This issue was evaluated by the NRC and determined to be of very low safety significance (Green). It was not greater than green because no occupational exposure limits were challenged as a result of this issue. This issue was documented in PPL's CAP as CR 1252765.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee Personnel

L. Casella, Senior System Engineer
C. Dodge, Simulator Mod Lead
G. Glaser, System Engineer
F. Hickey, Plant Chemist
K. Horsfall, Mod Installation Lead
M. Jacopettti, Simulator Trainer Lead
C. Manges, Regulatory Affairs
J. Schleicher, Design Engineer
S. Tanner, Operations

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000387/2010003-05 | URI | Configuration Control and Operation of ICS (4OA3.1) |
| 05000387/2010003-06 | URI | Predicted Plant Response to Large transient With ICS (4OA3.2) |

Opened/Closed

| | | |
|---|---|---|
| 05000387/2010003-01 | NCV | Failure to Correct IRM Condition Adverse to Quality (1R12) |
| 05000387; 388/2010003-02 | NCV | Failure to Correct Condition Adverse to Quality (1R13) |
| 05000387; 388/2010003-03 | NCV | Failure to Correct Condition with ESW LOOP/LOA Timer (1R15) |
| 05000387; 388/2010003-004 | NCV | Failure to Correct Condition Adverse to Quality (1R19) |

**LIST OF DOCUMENTS REVIEWED**
(Not Referenced in the Report)

**Section 1R01: Adverse Weather Protection**

Condition Report:

804730, 957471, 1269156, 1272638, 1272641

Procedures:

NDAP-00-0334, Summer Operations Preparations, Revision 4
GO-100-014, Unit 1 Hot Weather Operations, Revision 2
GO-200-014, Unit 2 Hot Weather Operations, Revision 1

**Section 1R04: Equipment Alignment**

Condition Reports (* NRC identified):

1251442*, 1256556

Procedures:

OP-173-001, Containment Atmosphere Control System, Revision 35
TR 3.6.1
CL-175-0011, Unit 1 24 DVC System Electrical, Revision 6
CL-150-0012, Unit 1 Reactor Core Isolation Cooling System Mechanical, Revision 21
CL-145-0051, Unit 1 RFPTICS HMI Electrical, Revision 0
CL-160-0011, Unit 1 Drywell Ventilation System Electrical, Revision 4
OP-216-001, RHR Service Water, Revision 24
TM-OP-016-ST, RHR Service Water, Revision 8

Drawings:

M-111, Sheet 1, ESW System, Revision 48
E-162641, Unit 2 RHRSW, Revision 29
E-106217, Revision 47

Other:

NUREG – 0776, SSES Safety Evaluation Report

**Section 1R05: Fire Protection**

Condition Reports (*NRC identified):

1259778*, 1259776*, 1269736*, 1270048*, 1253314

Procedures:

FP-013-150, Unit Lower Cable Spreading Room (C-300) Fire Zone 0-25E, Elevation 714'0", Revision 6
FP-013-204, Diesel Fire Pump Room (CW-21) Fire and Service Water Pump Area (CW-20), Revision 4
FP-013-155, Control Room (C-409) and Soffits, Revision 7
FP-113-123, Revision 4
FP-213-239, RCIC Pump Room (II-12) Fire Zone 2-1D Elevation 645'-0", Revision 7
FP-213-237, Core Spray Pump Room "A" (II-17) Fire Zone 2-1B Elevation 645'0", Revision 5
FP-213-236, Core Spray Pump Room (II-10) Fire Zone 2-1A Elevation 645'-0", Revision 6
FP-213-238, HPCI Pump Room (II-11) Fire Zone 2-1C Elevation 645'-0", Revision 5
FP-213-258, Revision 5

Drawings:

E-205963, Reactor Building Fire Zone Plan, Revision 10
E-205961, Reactor Building Fire Zone Plan, Revision 14

**Section 1R12: Maintenance Effectiveness**

Condition Reports:
1256018, 1256028, 1256035, 1256039, 1256120, 1256175, 1256178, 1256196, 1259579, 1258316, 1256021, 1017395, 1256129, 1256101, 1255562, 1255801, 1261049

Procedures:

GO-100-002, Plant Startup, Heatup and Power Operation, Revision 63
IC-078-001, Nuclear Instrumentation Cable and Detector Tests, Revision 13
IC-078-002, SRM/IRM Detector Replacement, Revision 7

Work Orders:

1256032, 1256193, 1256129, 1256428, 1055721, 1256053, 1017059, 1256101, 1155742, 1201073, 645746, 472305, 1061269, 723365, 892550

Other:

DBD055, Neutron Monitoring System, Revision 2
Engineering Journal – System 78: Nuclear Instrumentation
Susquehanna FSAR Section 7.6.1a.5.4, Revision 64
Maintenance Rule Basis Document – System 78
NRC Inspection Report 05000220/2007003
Operator Logs from April 16 through 20, 2010

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Condition Report:

1264948, 1265351, 1265461

Procedures:

SE-124-207, Unit 1 Division II Diesel Generator LOCA LOOP Test, April 7, 2010, Revision 19
SO-024-013, Offsite Power Source and Onsite Class 1E Operability Test, April 7, 2010, Revision 17
OP-003-002, Startup Bus 10 (OA103)/T10 Outage and Restoration, Revision 0
NDAP-QA-0340, Protected Equipment Program, Revision 6
PSP-26, Online and Shutdown Nuclear Risk Assessment and Management, Revision 5
NDAP-QA-1902, Maintenance Rule Risk Assessment and management Program, Revision 2
ON-003-001, Loss of Startup Bus 10, Revision 20
ON-104-001, Unit 1 Response to Loss of All Offsite Power, Revision 17

Drawings:

M-111, Sheet 1, ESW System, Revision 48

Other:

Unit 2 Risk Profile for April 7, 2010
Operations Logs, Unit 1 and Unit 2 for May 23, 2010
Risk Profile for Unit 1 and Unit 2 for Week of April 22, 2010
EOOS Risk Profile Results for Unit 1 and Unit 2 for June 17, 2010

**Section 1R15: Operability Evaluations**

Condition Reports and Action Requests (* NRC-identified):

1266476*, 1266462*, 1253890, 1049133, 1013355, 1120894, 781800, 1024772, 1071135, 1072104, 1259874, 1180050, 1172997, 1199333, 1263902, 1265163, 1269158, 1269107, 1269105, 780715, 1269115, 1269116, 1269765, 1269158, 1269107, 1270191, 1270252, 936219

Procedures:

SO-152-005, 24 Month HPCI Flow Verification Test, Revision 17
SO-252-004, HPCI Valve Exercising, Revision 26
SO-252-002, HPCI Flow Verification, Revision 45
SO-293-001, Turbine Valve Cycling, Revision 28
NDAP-QA-0703, Operability Assessment and Request for Enforcement Discretion, Revision 14

Work Orders:

1062273, 799168

Other:

1013115/1049133/1063521, Due Date Extension Forms
Time Delay Relay Issue Investigation
Technical Specification Table B 3.8.1-1 "Unit 1 and Unit 2 Load Timers"
HPCI Performance Monitoring Plan, November 23, 2009

**Section 1R18: Permanent Plant Modifications**

Condition Reports (* NRC identified):

436999

Procedures:

FSAR 7.7.1.4
FSAR Chapter 15

Other:

MFP-QA-1220, Engineering Change Process Handbook, Revision 7
PPL 50.59 Resource Manual, Revision 5
RIS 2002-22, Use of EPRI/NEI Joint Task Force Report, "Guideline on Licensing Digital Upgrades: EPRI TR-102348, Revision 1, NEI01-01: a Revision of EPRI TR-102348 to Reflect Changes to the 10 CFR 50.59 Rule
50.59 Evaluation
50.59 SE 00013, Integrated Control System and RFPT Speed Control, Unit 1
EC 940986 and EC 940983, Unit 2
EC 864462 and EC 910695, Revision 0
IN 2010-10, Implementation of a Digital Control System Under 10 CFR 50.59, Revision 0

**Section 1R19: Post-Maintenance Testing**

Condition Reports (*NRC-identified):

1252833, 1252834, 1252004, 1251995, 1263386, 1262646, 1266374, 1268944*, 1268969*

Procedures:

TP-148-012, EC-940983-HPU Post Modification Testing-RFPTA, January 21, 2010
TP-148-013, EC 940983-HPU Post Modification Testing-RFPTB, January 26, 2010
TP-148-014, EC 940983-HPU Post Modification Testing-RFPTC, February 14, 2010
TP-145-030, SAT ICS-Initial Calibration of FWLC, RX Recirculation Level Control, and RFPT Speed Control, March 14, 2010
TP-145-033, SAT (ICS) of FWLC, RRP and RFPT January 22, 2010
IC-148-001A, Removal and Restoration of RFPT 1A Instrumentation, Revision 3
OP-145-003, RFPT and RFPT Lube Oil System Testing, Revision 0
OP-002-001, Station Portable Diesel Generator, Revision 15
TP-145-034, ICS Startup and Flow Control Tuning, Revision 0
ON-030-001, Loss of Control Structure Chilled Water, Revision 10
OP-030-001, Control Structure Chilled Water System, Revision 31
TP-234-060, Post Maintenance Test for ECO 643549
TP-144-048, Condensate Pump Trip, Revisions 3 and 4
TP-193-041, EPU Phase 2 EHC Pressure Regulator Testing, Revision 1

Drawings:

07F717310-SC-1001, Functional Information Simplified Network, Revisions 0 and 1

Work Orders:

E1930-01, E1931-01, M1036-01, 1174554, 1255816

Other:

PCAF 2003-1893, Integrated Control System and RFPT Speed Control Unit 1 EC940986 and EC940983, Unit 2 EC864462 and EC910695, Revision 0
ICS Training and Evaluation for the Licensed Operators Schedule
C/I OP002, Human Machine Interface Workbook, Revision 12

**Section 1R20: Refueling and Other Outage Activities**

Condition Reports (* NRC identified):

1254048*

Procedures:

GO-100-010, ECCS/Decay Heat Removal in Mod 4, 5, or defueled, Revision 15
GO-100-012, Plant Startup, Heatup, and Power Operation, Revision 63
GO-100-005, Plant Shutdown to Hot/Cold Shutdown, Revision 46
GO-100-006, Cold Shutdown, Defueled and Refueling, Revision 41

Other:

Unit 1 Cycle 17 Sequence A2 Startup Control Rod Sequence

**Section 1R22: Surveillance Testing**

Condition Reports (* NRC identified):

1254734*, 1254636, 1254870, 1172997, 1259874, 1180050, 1199333

Procedures:

SE-100-002, ASME Class I Boundary System Leakage Test, Revision 20
SO-152-005, 24 Month HPCI Flow Verification, Revision 17
SO-253-004, Quarterly SBLC Flow Verification, Revision 35
OP-252-001, HPCI System, Revision 43
SO-252-004, HPCI Valve Exercising, Revision 26
NDAP-QA-0722, Surveillance Testing Program, Revision 16
NDAP-QA-0423, Station Pump and Valve Testing Program, Revision 19

Drawings:

SE-100-002, ASME Section XI IST Class 1 System Leakage Test, Sheet 1, Revision 8

Other:

Apparent Cause Evaluation for CR 1172997

**Section 1EP6 Drill Evaluation**

Procedures:

EP-TP-001, EAL Classification Levels, Revision 3

Other:

NEI 99-02, Regulatory Assessment Performance Indicator Guide List, Revision 6

**Section 2RS5: Radiation Monitoring Instrumentation**

Radiation Monitor Calibrations:

SC-134-108, RB Vent Accident Channels Calibration
SC-133-107, TB Vent Low Range Noble Gas Channel Calibration
SC-234-107, RB Vent Low Range Noble Gas Channel Calibration
SC-233-107, TB Vent Low Range Noble Gas Channel Calibration
SC-070-007, SBGT Vent Low Range Noble Gas Channel Calibration
SC-069-006, LRW Discharge Monitor Radiological calibration
SC-111-102, Unit 1 Service Water Effluent Radiation Monitor Calibration
SC-211-102, Unit 2 Service Water Effluent Radiation Monitor Calibration
SC-111-105, Unit 1 Supplemental Decay Heat Removal Service Water Radiation Monitor Calibration
SC-211-104, Unit 2 Supplemental Decay Heat Removal Service Water Radiation Monitor Calibration
SC-116-102, Unit 1A RHR Service Water Radiation Monitor Calibration
SC-116-103, Unit 1B RHR Service Water Radiation Monitor Calibration
SC-216-102, Unit 2A RHR Service Water Radiation Monitor Calibration
SC-216-103, Unit 2B RHR Service Water Radiation Monitor Calibration

Condition Reports:

1105164; 1105474; 1105495; 1105498; 1105674; 1108410; 1108894; 1119533; 1124306; 1126850; 1132486; 1133147; 1134466; 1138058; 1143470; 1143744; 1145434; 1146051; 1146256; 1152140; 1156356; 1158538; 1159002; 1166603; 1167326; 1169415; 1174133; 1174254; 1174968; 1176809; 1177151; 1188153; 1189703; 1190631; 1201563; 1201667; 1217779; 1218886; 1219231; 1232566; 1236000; 1236136; 1236137; 1241592; 1242297; 1249444; 1255741; 1257975; 1259765; 1153829; 1152053; 1162050; 1172303; 1174982; 1177673; 1218692; 1225031; 1255122

**Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

Susquehanna Steam Electric Station 2009 Annual Radioactive Effluent Release Report (April 2010)
Susquehanna Steam Electric Station Offsite Dose Calculation Manual (2009 Revision)
Susquehanna Steam Electric Station Technical Requirements Manual (2009 Revision)
Susquehanna Steam Electric Station QA Audit 819260/1027446, Chemistry/Effluents Audit Report
Methyl Iodide and DOP Test Results:
SE-070-A09, 2 Yr-A SGTS HEPA Filter & Charcoal Adsorber Inplace Leak Test

SE-070-B09, 2 Yr-B SGTS HEPA Filter & Charcoal Adsorber Inplace Leak Test
SE-070-A10, 2 Yr "A" SGTS Charcoal Test Canister Analysis for 0F169A
SE-134-Z1A, Rx Bldg HEPS & Charcoal Filter Efficiency Test
SE-134-C1A, Rx Bldg Zone 1 "A" Charcoal Test
SE-134-Z1B, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-134-C1B, Rx Bldg Zone 1 "B" Charcoal Test
SE-134-Z3A, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-134-C3A, Rx Bldg Zone 3 "A" Charcoal Test
SE-134-Z3B, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-134-C3B, Rx Bldg Zone 3 "B" Charcoal Test
SE-133-A01, Turbine Bldg HEPA & Charcoal Filter Efficiency Test
SE-133-B01, Turbine Bldg HEPA & Charcoal Filter Efficiency Test
SE-133-C1A, "A" Turbine Bldg Charcoal Test
SE-234-Z2A, Bldg HEPA & Charcoal Filter Efficiency Test
SE-234-Z2B, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-234-Z3A, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-234-Z3B, Rx Bldg HEPA & Charcoal Filter Efficiency Test
SE-234-C2A, Rx Bldg Zone 2 "A" Charcoal Test
SE-234-C2B, Rx Bldg Zone 2 "B" Charcoal Test
SE-234-C3A, Rx Bldg Zone 3 "A" Charcoal Test
SE-234-C3B, Rx Bldg Zone 3 "B" Charcoal Test
SE-233-A01, Turbine Bldg HEPA & Charcoal Filter Efficiency Test
SE-233-C2A, "A" Turbine Bldg Charcoal Test
SE-233-B01, Turbine Bldg HEPA & Charcoal Filter Efficiency Test
SE-233-C2B, " B" Turbine Bldg Charcoal Test
SE-030-A09, 2 Yr "A" CREOASS Filter Testing
SE-030-A10, 2 Yr "A" CREOASS Charcoal Test
SE-030-B09, 2 Yr "B" CREOASS Filter Testing
SE-030-B10, 2 Yr "B" Charcoal Test
SI-069-307, 24 Month Calibration – Liquid Radwaste Effluent Flow Monitor Channel
SI-069-207, Quarterly Functional Test – Liquid Radwaste Effluent Flow Monitor
SI-141-301, 24 Month Calibration Cooling Tower Discharge Flow Monitor Channel
SI-241-301, 24 Month Calibration – Cooling Tower Discharge Flow Monitor Channel
SI-041-201, Quarterly Functional Test – Cooling Tower Discharge Flow Monitors
SI-179-335, 24 Month Calibration – Rx Bldg Vent Purge Noble Gas Monitor
SI-179-235, Quarterly Functional Test – Rx Bldg Vent Effluent Flow Monitors
SI-279-335, 24 Month Calibration – Rx Bldg Vent Purge Noble Gas Monitor
SI-279-235, Quarterly Functional Test – Rx Bldg Vent Effluent Flow Monitors
SI-179-334, 24 Month Calibration – TB Vent Effluent Flow Rate Monitors
SI-179-234, Quarterly Functional Test – TB Vent Effluent Flow Rate Monitors
SI-279-334, 24 Month Calibration – TB Vent Effluent Flow Rate Monitors
SI-279-234, Quarterly Functional Test – TB Vent Effluent Flow Rate Monitors
SI-079-337, 24 Month Calibration – SGTS Stack Flow and Sampler Flow Rate Monitors
SI-079-237, Quarterly Functional Test – SGTS Effluent & Sampler Flow Rate Monitors
Liquid Radwaste Discharge Permits: 2010019; 2010020; 2010021; 2010022; 2010023

Weekly Gaseous Effluent Release Permits:

SC-134-101, Unit 1 Reactor Building Vent Weekly Iodine and Particulate Activity (March 2, 2010)

SC-234-101, Unit 2 Reactor Building Vent Weekly Iodine and Particulate Activity (March 2, 2010)
SC-133-101, Unit 1 Turbine Building Vent Weekly Iodine and Particulate Activity (March 2, 2010)
SC-070-001, Standby Gas Treatment Vent Weekly Iodine and Particulate Activity (March 2, 2010)
SC-233-101, Unit 2 Turbine Building Vent Weekly Iodine and Particulate Activity (March 2, 2010)
2009 Quarterly Analytics Chemistry Sample Cross Check Program Data

**Section 4OA1: Performance Indicator Verification**

Procedures:

NDAP-QA-0737, Reactor Oversight Process (ROP) Performance Indicators, Revision 5
TI-CH-106, Preparation of Monthly NRC PI – Reactor Coolant Specific Activity, Revision 4
SC-176-102, Unit 1 Primary Coolant Specific Activity – Dose Equivalent I-131, Revision 9
SC-276-102, Unit 2 Primary Coolant Specific Activity – Dose Equivalent I-131, Revision 9
OI-AD-094, NRC Performance Indicator Monthly Update Reactor Coolant System Identified Leakage (RCSL), Revision 0
SO-100-006, Shiftly Surveillance Operating Log, Revision 69

Other:

Operator Logs September 2009 – March 2010
HPCI UAI and URI Deviation Reports for Unit 1 and Unit 2

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

Condition Reports (* NRC identified):

1251381*, 1251850*, 1256491*, 1257298*, 1261773*, 1261775*, 1262164*, 1264795*, 1265728*, 1265740*, 1267223*, 1267224*, 1267225*, 1258863, 1232475, 1233794, 1219231, 1220769, 1225479, 1264546, 1235908

Other:

Station Health SSES Units 1, 2 and Common, September 1, 2009 – December 31, 2009
SSES Quarterly Trend Report First Quarter 2010
ECP Logs
Interview with Dan Crispell, ECP Representative
Station Performance Indicators

**Section 4OA3: Event Followup**

Condition Reports:

1257776, 1257880

Procedures:

SI-164-303, 24 Month Calibration of ATWS-RPT System and Ari Trip System Reactor Vessel Low Level Channels LIS-B21-IN025A, B, C, D, Revision 12
T.S. 3.3.4.2 and Bases
TP-199-013, Unit 1 Phase 2 EPU Master Test Procedure, Revision 0
GO-100-012, Power Maneuvers, Revision 33
GO-100-006, Cold Shutdown, Defueled and Refueling, Revision 41
GO-100-005, Plant Shutdown to Hot/Cold Shutdown, Revision 46
GO-100-010, ECCS/Decay Heat Removal in Mode 4, 5, or Defueled, Revision 15

Other:

Renewed Operating License No. NPF-14

**Section 4OA5: Other Activities**

Condition Reports:

1270474, 1270880

Procedures:

TP-144-048, Condensate Pump Trip, Revision 3

## LIST OF ACRONYMS

| | |
|---|---|
| AAA | Agency Allegation Advisor |
| AC | Alternating Current |
| ADAMS | Agencywide Document and Access Management System |
| ALARA | As Low As Is Reasonably Achievable |
| ARERR | Annual Radiological Effluents Release Report |
| AREOR | Annual Radiological Effluents Operating Report |
| CAP | Corrective Action Program |
| CAQ | Condition Adverse to Quality |
| CFR | Code of Federal Regulations |
| CPT | Condensate Pump Trip |
| CR | Condition Report |
| CSC | Control Structure Chiller |
| DG | Diesel Generator |
| EAL | Emergency Action Level |
| ECP | Employee Concerns Program |
| EDG | Emergency Diesel Generator |
| EHC | Electrohydraulic Control |
| EOOS | Equipment Out-of-Service |
| EP | Emergency Preparedness |
| EPU | Extended Power Uprate |
| ER | Engineering Request |
| ESW | Emergency Service Water |
| FC | Flow Control |
| FIN | Finding |
| FSAR | [SSES] Final Safety Analysis Report |
| FWH | Feedwater Heater |
| GE | General Electric |
| GPI | Groundwater Protection Initiative |
| GWE | General Work Environment |
| HEPA | High-Efficiency Particulate Air |
| HPCI | High Pressure Coolant Injection |
| HVAC | Heating, Ventilation and Air-Conditioning |
| I&C | Instrumentation and Controls |
| ICS | Integrated Control System |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| IR | NRC Inspection Report |
| IRM | Intermediate Range Monitor |
| LERF | large Early Relief Frequency |
| LOCA | Loss of Coolant Accident |
| LOOP | Loss of Offsite Power |
| NCAQ | Condition Not Adverse to Quality |
| NCV | Non-Cited Violation |
| NDAP | Nuclear Department Administrative Procedure |
| NEI | Nuclear Energy Institute |
| NIST | National Institute of Standards and Technology |
| NRC | Nuclear Regulatory Commission |
| OA | Other Activities |

| | |
|---|---|
| ODCM | Offsite Dose Calculation Manual |
| OOS | Out-of-Service |
| PCE | Potential Chilling Effect |
| PI | [NRC] Performance Indicator |
| PI&R | Problem Identification and Resolution |
| POAH | Point of Adding Heat |
| QA | Quality Assurance |
| RB | Reactor Building |
| RCA | Root Cause Analysis |
| RCIC | Reactor Core Isolation Cooling |
| RCS | Reactor Coolant System |
| RETS | Radiological Effluents Technical Specifications |
| RFPT | Reactor Feedpump Turbine |
| RFO | Refuel Outage |
| RHRSW | Residual Heat Removal Service Water |
| RLTCS | Refrigerant Low Temperature Cutout Switch |
| RMS | Radiation Monitoring System |
| ROP | Reactor Oversight Process |
| RPS | Reactor Protection System |
| RTP | Rated Thermal Power |
| SCWE | Safety Conscious Work Environment |
| SDP | Significance Determination Process |
| SIL | Service Information Letter |
| SLC | Standby Liquid Control |
| SRO | Senior Reactor Operator |
| SSC | Structures, Systems and Components |
| SSES | Susquehanna Steam Electric Station |
| TBC | Turbine Building Chiller |
| TCV | Turbine Control Valve |
| TDR | Time Domain Reflectometry |
| TRM | Technical Requirements Manual |
| TS | Technical Specifications |
| URI | Unresolved Item |
| WO | Work Order |