January 23, 2006

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC INTEGRATED INSPECTION REPORT 05000387/2005005 AND 05000388/2005005

Dear Mr. McKinney:

On December 31, 2005, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed integrated inspection report documents the results of that inspection, which were discussed on January 13, 2006, with Mr. R. Pagodin, General Manager - Nuclear Engineering and other members of your staff.

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

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

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publically Available Records (PARS) component of the

NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

**/RA/**

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

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

Enclosures: Inspection Report 05000387/2005005 and 05000388/2005005
Attachment: Supplemental Information

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos.: 50-387, 50-388

License Nos.: NPF-14, NPF-22

Report No.: 05000387/2005005 and 05000388/2005005

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: Berwick, PA

Dates: October 1, 2005 through December 31, 2005

Inspectors: B. Bickett, Senior Resident Inspector
F. Jaxheimer, Resident Inspector
S. Barr, Sr. Emergency Preparedness Inspector
J. Furia, Sr. Health Physicist
T. Setzer, Project Engineer

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

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## SUMMARY OF FINDINGS

IR 05000387/2005-005, 05000388/2005-005; 10/01/2005 - 12/31/2005; Susquehanna Steam Electric Station, Units 1 and 2; Problem Identification and Resolution.

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

A. NRC Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A Green, self-revealing non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified because PPL failed to provide adequate procedural instructions associated with foreign material controls when working in emergency diesel generator (EDG) bays or work areas. As a result, foreign material caused a failure of the "C" EDG turbocharger during its biennial 24 hour endurance run and the associated inoperability of the "C" EDG. PPL entered this issue for resolution in their corrective action program and have incorporated Foreign Material Exclusion (FME) controls for all EDG work areas in station procedures.

  The finding is more than minor because it is associated with the Mitigating System cornerstone attribute of equipment reliability and availability and affected the cornerstone's objective of ensuring that safety-related equipment is capable of responding to initiating events to prevent undesirable consequences. This finding was considered to have very low safety significance (Green) using Phase 1 of the significance determination process because it did not result in a actual loss of safety function and it was not potentially risk-significant due to external events. (Section 4OA2)

B. Licensee Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Susquehanna Steam Electric Station (SSES) Unit 1 operated at or near full power during the inspection period except for mid-cycle refueling outage to evaluate and correct control cell friction. The unit was shutdown for the mid-cycle outage on October 28, 2005, and returned to full rated thermal power on November 18, 2005.

Unit 2 began the inspection period at full RTP and operated at or near full RTP during the inspection period with the exception of a planned reduction to 75 percent power on the weekend of December 3rd, 2005 to clean sections of the main condenser waterbox, and perform a control rod sequence exchange.

## 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment (71111.04Q - 4 Samples)

a. Inspection Scope

Partial System Walkdowns. The inspectors performed partial system walkdowns to verify system and component alignment and to note any discrepancies that would impact system operability. The inspectors verified selected portions of redundant or backup systems and trains were available while risk significant or safety-related systems and components were out-of-service. The inspectors reviewed applicable operating procedures, verified selected valve and switch positions, electrical power availability, and the general condition of major system components. The walkdowns included the following systems:

- Unit 1 residual heat removal (RHR) Division II while Division I in system outage
- Unit 2 reactor core isolation cooling (RCIC) post start-up testing
- Units 1 and 2 emergency diesel electrical and starting air system
- Unit 2 instrument air with A/B air dryer skids out of service

The documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 9 Samples)

a. Inspection Scope

The inspectors reviewed PPL's fire protection program to determine the required fire protection design features, fire area boundaries, and combustible loading requirements

for selected areas. The inspectors walked down those areas to assess PPL's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures to assess PPL's fire protection program in those areas. The inspected areas included:

- Units 1 and 2 control room and technical support center , FP-013-168
- Unit 1 EHC skid and lube oil area, fire zone O-TB
- Unit 1 125 VDC battery/charger rooms - Div I and II
- Unit 1 main condenser area - fire zone 1-32D, FP-113-291
- Unit 1 hydrogen seal oil, fire zones 1-33B, FP-113-224
- Unit 1 equipment and battery rooms, FP-013-168
- Unit 2 RCIC / high-pressure coolant injection (HPCI), fire zones 2-1C and 2-1D
- Unit 2 RHR rooms Division II, fire zones 2-1E
- Unit 2 equipment and battery rooms, FP-013-171

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 2 Samples)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed documents and inspected safety-related and risk significant structures, systems, and components to evaluate the adequacy of internal flood protection measures. The inspectors performed walkdowns of the emergency service water pump house, residual heat removal service water (RHRSW) rooms, and two manholes that contained risk significant and safety-related cabling for both RHRSW and ESW control and power cables. The inspectors observed the condition of the accessible manholes including the water level compared to electrical cable height. The inspectors verified that adequate procedures were in place to identify and respond to flooding.

b. Findings

No findings of significance were identified.

.2 External Flooding

a. Inspection Scope

The inspectors reviewed documents and inspected structures, systems, and components (SSCs) to evaluate the adequacy of external flood protection measures for safety-related and risk-significant systems and structures. The inspectors interviewed plant personnel, performed walkdowns of the relevant areas between the cooling tower

basin and the turbine building to verify the adequacy of watertight doors, manholes, flood mitigation doors, site topography, and other flood protection features. The inspectors also specifically verified that oil and water intrusion found in the 13.8KV electrical vault (manhole # 8) did not effect the operability of electrical cabling.

b. Findings

No findings of significance were identified.

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

.1 Biennial Review

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, Rev. 9, "Operator Licensing Examination Standards for Power Reactors," Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program," and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)," as acceptance criteria, 10 CFR 55.46 Simulator Rule (sampling basis). These inspection activities were performed for both units.

The inspectors reviewed documentation of operating history since the last requalification program inspection. The inspectors also discussed facility operating events with the resident staff. Documents reviewed included NRC inspection reports and PPL Condition Reports (CRs) that involved human performance and Technical Specification compliance issues. More specifically, the inspectors focused on CRs related to work control/plant configuration and operability determinations, and they reviewed the following plant CAP Reports:

- CR 553337: ECP event - breaker found close and should have been open
- CR 615703: Step missed during backwash and precoat of 2A RWCU filter demineralizer
- CR 555114: Component manipulated on Unit 1 instead of Unit 2
- CR 607263: Valve on CO found misaligned
- CR 658233: Open paperwork discovered against Unit 2 RHR after system had been declared operable
- CR 623572: Tech Spec 3.6.1.3 entry missed during performance of surveillance test
- CR 641849: LCO 3.6.1.3 for HV-249-F031 cleared while VOTES testing still in progress.

The year 2005 was the off-year for the administration of the required biennial written exam, so the inspectors reviewed four biennial written exams administered in 2004. The inspectors reviewed the six simulator scenarios administered over the two weeks of the inspection and several job performance measures (JPMs) administered during the

inspection, to ensure the quality of these exams met or exceeded the criteria established in the examination standards and 10 CFR 55.59.

The inspectors observed the administration of operating examinations to the “F” and “C” operating shifts. The inspectors observed the administration of three simulator scenarios for each operating crew and an additional two for crew “F” as part of that crew’s remediation following their failure during one of their initial scenarios. The inspectors also observed one set of JPMs administered to each individual of crew “F`.” As part of the examination observation, the inspectors assessed the adequacy of station examination security measures.

The inspectors interviewed four evaluators, two training supervisors, three ROs, and four SROs for feedback regarding the implementation of the licensed operator requalification program. The inspectors also reviewed a number of self-assessments (SA OP-02-017, SA NTG-03-17, SA NTG-04-01, and SA NTG-04-07), a QA audit report (Internal Audit Report 578038), and the latest accreditation self-evaluation report, to ensure that the training staff modified the program when appropriate to recommended changes.

Remedial training was assessed through the review of evaluation records for the past two years, to ensure remediation plans were unique to the individual failures, timely, and effective. Specifically, the inspectors reviewed remediation records for one crew and two individuals who had failed their last annual operating test, and two individuals who had failed their last biennial written examination. The inspectors also reviewed the remediation package for the observed crew “F” simulator scenario crew failure and observed the simulator scenario evaluation following the crew’s remedial training.

Conformance with operator license conditions was verified by reviewing the following records:

- Attendance records for the last two-year training cycle,
- Medical records for the entire “F” operating shift (>10% of all licensed operators) to confirm all records were complete, which restrictions noted by the doctor were reflected on the individuals’ license and that the exams were given within 24 months, and
- Proficiency watch-standing and reactivation records for all active operator licenses.

The inspectors observed simulator performance during the conduct of the examinations, and reviewed simulator performance tests and discrepancy reports to verify compliance with the requirements of 10 CFR 55.46. Susquehanna is committed to the ANSI 3.5-1985 standard. The inspectors reviewed simulator configuration control and performance testing through interviews and the review of: facility simulator procedures; open and closed simulator issue reports and maintenance orders; and the review of test results. Specifically, the following tests were reviewed:

Normal, Malfunction and Transient tests:

- Test 5302, Transient Performance - Simultaneous trip of all feedwater pumps
- Test 5306, Transient Performance - Main turbine trip (maximum power without immediate reactor scram)
- Test 5308, Transient Performance - maximum size RCS rupture combined with loss of offsite power
- Test 5227, Malfunction - Loss of component cooling to individual component (TBCCW leakage)
- Test 5246, Malfunction - Nuclear Instrumentation failure (SRM Channel A)

Steady-State test:

- Test 5501, Steady State Performance - 30%
- Test 5503, Steady State Performance - 100%

On November 1, the inspectors conducted an in-office review of PPL requalification exam results. The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspectors verified that:

- Crew failure rate on the dynamic simulator was less than 20%. (Failure rate was 4.2%.)
- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Failure rate was 1.3%.)
- Individual failure rate on the walkthrough test (JPMs) was less than or equal to 20%. (Failure rate was 1.3%.)
- Individual failure rate on the comprehensive biennial written exam was less than or equal to 20%. (N/A due to 2005 being the off-year for the biennial written exam.)
- More than 75% of the individuals passed all portions of the exam. (93.5% of the individuals passed all portions of the exam.)

.2 Resident Inspector Quarterly Review

a. Inspection Scope

On November 21, 2005, the inspectors observed licensed operator performance in the plant's simulator during operator requalification training. The inspectors compared their observations to Technical Specifications (TS), emergency plan implementation, and the use of emergency operating procedures. The inspectors also evaluated PPL's critique of the operators' performance to identify discrepancies and deficiencies in operator training. This inspection activity represented one sample. The following training scenario was observed:

C Reactor pressure vessel flooding and rapid depressurization, simulator licensed operator requalification OP 002-06-01-03

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 4 Samples)

a. Inspection Scope

The inspectors evaluated PPL's work practices and follow-up corrective actions for selected system, structure, or component (SSC) issues to assess the effectiveness of PPL's maintenance activities. The inspectors reviewed the performance history of those SSCs and assessed PPL's extent of condition determinations for these issues with potential common cause or generic implications to evaluate the adequacy of PPL's corrective actions. The inspectors reviewed PPL's problem identification and resolution actions for these issues to evaluate whether PPL had appropriately monitored, evaluated, and dispositioned the issues in accordance with PPL procedures and the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed selected SSC classification, performance criteria and goals, and PPL's corrective actions that were taken or planned, to verify whether the actions were reasonable and appropriate. The following issues were reviewed:

Equipment Issues

- Emergency diesel generator (EDG) "C" turbocharger failure
- Unit 1 - Control cell friction and bowing
- Unit 2 - Reactor building (RB) chiller - low refrigerant level trip
- Unit 1 ESW pump start relay failure

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

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

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

- Standby gas treatment system recirculation plenum damper actuator replacement, RLWO 709198
- T-10 transformer system outage work with loss of service air compressor
- Repetitive EHC filter replacement on high differential pressure, AR 721987, 722010 and 724674
- T-20 transformer system work on cooling fans, AR 727472
- Unit 1 instrument air compressors out of service for maintenance outage, PCWO 692130
- "B" EDG trip on low turbocharger lube oil pressure, AR 737329

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-routine Evolutions and Events (71111.14 - 2 Samples)

a. Inspection Scope

For the non-routine events described below, the inspectors reviewed operator logs, plant computer data, evolution data, and appropriate procedures to review what occurred and how the operators responded, and to determine if the response was in accordance with plant procedures.

Multiple Control Rods Slow-to-Settle

PPL performed control cell friction testing on October 1, 2005, that required a load drop to approximate 75% reactor power and was a 36 hour evolution. Approximately 71 rods of the friction susceptible population on Unit 1 were tested. Several rods failed to settle and PPL then proceeded to perform scram time testing and insert-stall testing to prove operability. The inspectors assessed operator performance associated with the Unit 1 control cell friction testing and reviewed operability evaluation for all control rods tested including a review of scram time test data that was indicative of increasing control rod friction.

Main Condenser Waterbox cleaning and Rod Sequence Exchange

PPL performed main condenser waterbox cleaning on December 3, 2005, that required a load drop to approximately 75% reactor power. Just prior to the down power, PPL replaced several control rod hydraulic control unit accumulators and while at reduced power, plant operators conducted a control rod sequence exchange. The inspectors assessed operator performance associated with the reactivity manipulations needed to support the HCU maintenance, the down power and the rod sequence exchange. Inspectors evaluated the plant system performance at reduced power levels and following maintenance; as well as, procedure compliance during the infrequently performed activities.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 4 Samples)

a. Inspection Scope

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

- 4 KV breaker relays not tested IAW MT-GE-042, AR 719262
- Unit 1 “A” drywell sump level indication, AR 722736
- T-20 transformer with inoperable cooling fans, AR 727472
- “B” emergency diesel generator (EDG) turbocharger lube oil pressure control, AR 729808

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds (71111.16 - 3 Samples)

a. Inspection Scope

Individual Work-Around Reviews. The inspectors reviewed the most significant control room deficiencies, equipment trouble tags, and selected corrective action reports to determine whether these items would affect the functional capability of a system or a human reliability response during an event. This review evaluated an operator’s ability

to implement abnormal and emergency procedures during postulated plant transients with the existing deficiency or challenge. The following issues were reviewed:

- Unit 1 control rod operational challenges during rod pattern adjustments and unit shutdown
- 1A reactor feed pump turbine (RFPT) failure to reset from control room

Cumulative Effects Review: The inspectors also reviewed the aggregate impact of Unit 1 and Unit 2 operator workarounds and challenges, equipment deficiencies, open TROs and operability evaluations. The inspectors evaluated the cumulative effects of these items on the ability of operators to respond in a correct and timely manner. The inspectors also reviewed these deficiencies to determine if there were any items that complicated the operators' ability to implement emergency operating procedures, but were not identified as operator workarounds.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 6 Samples)

a. Inspection Scope

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

- Unit 2 standby gas treatment damper stroke following actuator replacement, OP-134-002 and work instruction E1943-32
- Unit 1 125 V DC battery charger repair and inspections, SM-102-001 and WO-665225
- Unit 1 24 month RCIC logic system functional, SE-150-001 following system outage
- Unit 1 control rod stroke testing, TP-055-001 following fuel rechannel and reconfiguration maintenance outage
- Unit 1 HPCI flow verification following system outage work
- "D" EDG unexplained load reduction and repair; replacement of 125VDC power supply

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20 - 1 Sample)

a. Inspection Scope

Mid-Cycle Refueling Outage. The inspectors reviewed the outage risk management plan for the Unit 1 mid-cycle refueling outage, conducted October 31 to November 14, 2005, to confirm that PPL had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the refueling outage, the inspector observed and / or reviewed the outage activities listed below.

- Plant shutdown and cool down activities
- Outage risk management including changes due to emergent work
- Outage configuration controls including:
  1) availability and accuracy of reactor coolant system (RCS) instrumentation
  2) electrical power alignments
  3) decay heat removal system operation, including fuel pool cooling system
  4) availability of reactor inventory makeup water systems
  5) secondary containment controls and integrity
- Drywell and refuel floor walkdowns after shutdown and prior to final closeout
- Fuel handling operations including fuel movement, control of reactivity, fuel assembly tracking, rechanneling efforts, and core verification activities
- Reactor startup, including plant restart reviews, system restoration and testing, preparation for reactor mode changes, control rod withdrawal, reactor criticality, RCS heat up, and reactor power increases.

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 Technical Specification requirements and operating procedures.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 2 Samples)

a. Inspection Scope

The inspectors observed portions of selected surveillance test activities in the control room and in the field, and they reviewed the test data results. The inspectors compared the test results to the established acceptance criteria and the applicable Technical Specification, Technical Requirements Manual operability and surveillance requirements

to evaluate whether the systems were capable of performing their intended safety functions. The observed surveillance tests included:

- Unit 2, Division II, RHR flow surveillance, SO-249-B02 inservice test (IST)
- Unit 2, RCS leakage surveillance, SO-200-006, shiftly surveillance operating log

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

a. Inspection Scope

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

- Electro hydraulic control portable fluid conditioning equipment, AR 724674

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 - 1 Sample)

a. Inspection Scope

During November 17, 2005, the inspectors observed portions of a technical support center (TSC) and emergency operating facility (EOF) drill. The inspectors assessed the station's emergency response and their adherence to emergency plan implementing procedures, and their response to simulated degraded plant conditions to identify weaknesses and deficiencies in classification and notification. The inspectors observed and reviewed PPL's critique of the drill's participants to evaluate PPL's identification of weaknesses and deficiencies. The inspectors compared PPL's identified findings

against the inspectors' observations to determine whether PPL adequately identified problems. The inspectors' review included the following documents and procedures:

- TSC / EOF scenarios, classifications, and time-lines - November 2005

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 7 Samples)

a. Inspection Scope

The inspectors reviewed all Susquehanna performance indicators (PIs) for the Occupational Exposure Cornerstone for followup.

The inspectors reviewed PPL's self assessments, audits, Licensee Event Reports, and Special Reports related to the access control program since the last inspection and determined that identified problems were entered into the corrective action program for resolution.

The inspectors reviewed corrective action reports related to access controls. Included in this review were high radiation area radiological incidents (non-PIs, identified by PPL) in high radiation areas <1R/hr that have occurred since the last inspection in this area.

For repetitive deficiencies or significant individual deficiencies in problem identification and resolution identified above, the inspectors determined that PPL's self-assessment activities were also identifying and addressing these deficiencies.

The inspectors reviewed documentation packages for all PI events occurring since the last inspection, and determined that none of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at 1 meter. For unintended exposures >100 mrem TEDE (or >5 rem SDE or >1.5 rem LDE), the inspectors determined that there were no overexposures or substantial potential for overexposure.

The inspectors reviewed radiological problem reports since the last inspection which found that the cause of the event was due to radiation worker errors; determined that there was no observable pattern traceable to a similar cause; and, determined that this perspective matches the corrective action approach taken by PPL to resolve the reported problems. The inspector verified that there was adequate posting and locking of entrances to high radiation areas and very high radiation areas.

The inspectors reviewed radiological problem reports since the last inspection that found that the cause of the event was radiation protection technician error; determined that there was no observable pattern traceable to a similar cause; and, determined that this perspective matches the corrective action approach taken by PPL to resolve the reported problems.

The inspectors reviewed and assessed the adequacy of PPL's internal dose assessment for any actual internal exposure greater than 50 mrem CEDE.

The inspectors conducted observations of work activities associated with the Unit 1 mid-cycle maintenance outage, including work activities in the drywell, reactor building, turbine building and refueling floor.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors determined that there have not been any declared pregnant workers during the current assessment period. The inspectors reviewed the exposure results and monitoring controls employed by PPL with respect to requirements of 10 CFR 20.

Utilizing PPL records, the inspectors determined the historical trends and current status of tracked plant source terms and determined that PPL is making allowances or developing contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry.

The inspectors reviewed dose goals established for the Unit 1 mid-cycle maintenance outage (7 person-rem), and the ALARA reviews associated with these work activities.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 3 Samples)

d. Inspection Scope

The inspectors verified the calibration, operability, and alarm setpoints of several types of instruments and equipment including: review of calibration documentation and observation of source check or calibrator exposed readings. The inspectors determined what actions are taken when, during calibration or source checks, an instrument is found significantly out of calibration (>50%); determined possible consequences of instrument use since last successful calibration or source check; and, determined that the out of calibration result was entered into the corrective action program.

Based on final safety analysis report (FSAR), Technical Specifications and Emergency Operating Procedures requirements, the inspectors reviewed the status and surveillance records of self-contained breathing apparatus (SCBA) staged and ready for use in the plant; inspected PPL's capability for refilling and transporting SCBA air bottles to and from the control room and operations support center during emergency conditions; determined that control room operators and other emergency response and radiation protection personnel were trained and qualified in the use of SCBA; and, determined that personnel assigned to refill bottles were trained and qualified for that task.

The inspectors reviewed the qualification documentation for onsite personnel designated to perform maintenance on the vendor-designated vital components, and the vital component maintenance records for three SCBA units currently designated as "ready for service"; ensured that the required, periodic air cylinder hydrostatic testing was documented and up to date, and the Department of Transportation (DOT) required retest air cylinder markings were in place.

The inspectors conducted an onsite review of the dosimetry laboratory located in Allentown. This included direct observation of processing, together with a review of audits, quality assurance testing and National Voluntary Laboratory Accreditation Program audits and tests.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 - 3 Samples)

e. Inspection Scope

Cornerstone: Emergency Preparedness

The inspector reviewed PPL's procedure for developing the data for the Emergency Preparedness (EP) PIs, which are: (1) Drill and Exercise Performance (DEP); (2) ERO Drill Participation; and (3) ANS Reliability. The inspector also reviewed the station's drill/exercise reports, training records, and ANS testing data to verify the accuracy of the reported data. Data generated since the September 2004 EP PI verification was reviewed during this inspection. Therefore, data submitted from the fourth quarter of 2004 and the first three quarters of 2005 were reviewed. The review was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria used for the review were 10 CFR 50.9 and NEI 99-02, Revision 3, Regulation Assessment Performance Indicator Guideline.

Cornerstone: Occupational Radiation Safety

Occupational Exposure Control Effectiveness PI

The inspectors reviewed all Susquehanna PIs for the Occupational Exposure Cornerstone for follow-up. The inspectors reviewed a listing of PPL action reports for the period January 1, 2005 through November 4, 2005 for issues related to the occupational radiation safety PI, which measures non-conformance with high radiation areas greater than 1R/hr and unplanned personnel exposures greater than 100 mrem total effective dose equivalent (TEDE), 5 rem skin dose equivalent (SDE), 1.5 rem lens dose equivalent (LDE), or 100 mrem to the unborn child.

The inspectors determined if any of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at 1 meter. If so, the inspectors determined what barriers had failed and if there were any barriers left to prevent personnel access. For unintended exposures >100 mrem TEDE (or >5 rem SDE or >1.5 rem LDE), the inspector determined if there were any overexposures or substantial potential for overexposure.

Cornerstone: Public Radiation Safety

The inspectors reviewed a listing of Susquehanna station action reports for the period January 1, 2005 through November 4, 2005 for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences per site that exceed 1.5 mrem/qtr whole body or 5 mrem/qtr organ dose for liquid effluents; or 5 mrads/qtr gamma air dose, 10 mrads/qtr beta air dose; or 7.5 mrems/qtr organ doses from I-131, I-133, H-3 and particulates for gaseous effluents.

b. Findings

No findings of significance were identified.

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

.1 Resident Daily PI&R Review

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

.2 Semi-Annual PI&R Trend Review

The inspectors reviewed a list of action request (AR) items that were identified by the station from July 2005 to December 2005. The review was performed as a part of the semi-annual problem and identification trend review of the Susquehanna corrective action program. ARs with Management subtype were reviewed that were specifically not designated as condition reports (CR), and therefore, received less station and control room oversight. This review consisted of 14 ARs to verify that an the issue was properly identified and that no actual conditions adverse to quality existed. The

inspectors evaluated the ARs against the requirements of NDAP-QA-0702, "Action Request and Condition Report Process," and 10 CFR, Appendix B.

.3 Annual PI&R Sample Review

"C" Emergency Diesel Generator Turbocharger Failure

a. Inspection Scope

The inspectors reviewed PPL's corrective actions and response to the "C" EDG turbocharger failure during its biennial 24 hour endurance run in May 2005. The inspection activities included plant walk-downs, an in-office review, and discussions with engineering, maintenance and operations personnel. The inspector reviewed PPL's evaluations and associated corrective actions for selected CRs related to the "C" EDG. The "C" EDG was selected due to the safety-related impact of the event and the risk insights with respect to a loss of an EDG. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), operating procedures, maintenance procedures, system health reports and self assessments to ensure the equipment is operated and maintained consistent with the design and risk significance of the system. This inspection activity represented one sample.

b. Findings

Inadequate Foreign Material Exclusion (FME) Controls Associated with Work on Emergency Diesel Generators

Introduction: A green, self-revealing Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" was identified for failure to provide adequate procedural instructions associated with foreign material controls when working in EDG bays or work areas.

Description: On May 9, 2005, "C" EDG was placed in service to perform a Technical Specifications required biennial 24 hour endurance run surveillance test. Approximately 20 hours into the test, the "C" EDG experienced high vibrations and automatically tripped due to those vibrations. PPL declared the "C" EDG inoperable and followed the appropriate Technical Specification requirements.

After the event, PPL performed a root cause investigation that found severe impeller damage to the engine's turbocharger caused by foreign material impingement. The foreign material was located and found to be a ½ x 3/4 inch bolt belonging to a lapping tool that used to polish and clean metal surfaces. PPL determined this tool had been used for work on cylinder head 4R of the "C" EDG in May 2000. In May 2000, EDG pre-work activities were performed in a diesel shed located onsite. The pre-work activities included lapping and installation of valves, keepers and rockers in cylinder heads to be installed on the EDGs at a later date. PPL employed these pre-work activities in order to adequately prepare for upcoming diesel overhauls. The tool used for lapping included a ½ x 3/4 inch bolt. Investigation of this tool and all tools used in the pre-work activities proved the bolt belonged to the lapping tool used in May 2000. It was not until July 2001 that the cylinder head 4R was installed in the "C" EDG. After

installation and up until May 2005, the “C” EDG had passed its monthly surveillances with no indication of a loose bolt in a cylinder head. However, during the 24 hour endurance run of “C” EDG on May 10, 2005 the turbocharger was severely damaged due to this bolt when the bolt dislodged from the cylinder head.

FME controls are required for work on safety-related systems by PPL plant procedure NDAP-QA-0503, “General Housekeeping and Foreign Material Exclusion.” During post-event reviews, PPL determined that the current stations procedure did not identify appropriate instructions for FME controls for EDG bays nor associated diesel work areas. Specifically, there was not adequate station guidance or acceptance criteria for FME standards that were to be applied for work in these diesel areas. The procedure failed to specify work practices, acceptance criteria and methods necessary to prevent foreign material from being left inside diesel components. If the FME procedure contained these written instructions it is likely that the foreign material introduction would have been prevented in accordance with station guidance. PPL entered this issue for resolution in their corrective action program and have incorporated FME controls for EDG work areas.

Analysis: The inspectors determined that PPL’s performance deficiency was the failure to provide adequate FME guidance appropriate to the working areas for the safety-related diesel generators. The finding is more than minor because it is associated with the Mitigating System cornerstone attribute of equipment reliability and availability and affected the cornerstone’s objective of ensuring that safety-related equipment is capable of responding to initiating events to prevent undesirable consequences. The finding can be a more significant safety concern because a weakness in FME work controls can lead to increased likelihood of equipment failure when it is called upon to perform its intended safety function(s).

This finding was assessed in accordance with NRC Manual Chapter 0609, Appendix A, Attachment 1 (Phase 1), “SDP for Reactor Inspection Findings for At-Power Situations,” and was determined to be of very low safety significance (Green) since the all other EDGs remained operable. The loss of the “C” EDG did not represent a loss of a system safety function and it was inoperable for less than the Technical Specification allowed outage time. This finding was not potentially risk significant due to a fire, seismic, or severe weather initiating event. Therefore, this finding is of a very low safety significance and results in a Green finding.

Enforcement: 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires in part, that activities affecting quality shall be prescribed by, and be accomplished in accordance with, documented instructions, procedures or drawings, and shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, PPL maintenance procedures used for EDG FME controls prior to the event were not adequate and did not contain appropriate instructions when performing safety-related work in diesel areas. This resulted in a subsequent turbocharger damage to the “C” EDG and its associated inoperability on May 9, 2005. PPL has corrected station procedures and incorporated appropriate FME controls for EDG work areas.

Because this violation was of very low safety significance and was entered into PPL's corrective action program (AR 675151), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. NCV 05000387, 05000388/2005005-001, Inadequate Foreign Material Exclusion (FME) Procedural Instructions associated with EDG work

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

.1 (Closed) LER 05000388/2005-004-00 Common Mode Failure of the Inboard "A" and "B" Loop RHR Shutdown Cooling Testable Check Valves Due to Vibration-Inducted Seat Damage

On March 2, 2005, it was identified during an LLRT that the "A" RHR Shutdown Cooling containment penetration X-13A line failed to pressurize. Later on March 4, 2005, a second penetration line, X-13B 'B' RHR Shutdown Cooling containment penetration line, failed to pressurized. The testable check valves in both the lines were found to be leaking by due to vibration induced seat damage. This represented a common mode failure and as such was reported in accordance with 10CFR50.73(a)(2)(vii). Because the other primary containment isolation valves in each line were operable and closed, there were no violations associated with the failure of the testable check valves to seat leak tight. The LER was reviewed by the inspectors and no additional findings of significance were identified. PPL documented their corrective actions for this event in AR 716520. This LER is closed.

.2 (Closed) LER 05000388/2005-05-00 & 01 Reactor Automatic Scram due to a Main Generator Lockout

On June 6, 2005, Susquehanna Unit 2 automatically scrammed in response to a main generator lockout which was caused by a loss of generator field. All control rods inserted and all safety systems responded as designed. PPL performed a root cause evaluation for the event and determined that the controlling circuitry for the generator excitation system did not have the minimum voltage requirement to perform properly due to increased resistance in the circuitry. When responding in an attempt to maintain generator voltage in automatic, the control circuit voltage dropped below minimum requirement and the excitation system was no longer able to function, resulting in a loss of exciter field. There were no violations associated with the failure of the generator excitation system. The LER including the root cause and corrective actions were reviewed by the inspectors and no additional findings of significance were identified. PPL documented their corrective actions for this event in AR 681673. This LER is closed.

4OA5 Other Activities

.1 Institute of Nuclear Power Operations Plant Assessment Report Review

a. Inspection Scope

The inspectors reviewed the final report for the INPO plant assessment of SSES conducted in November 2005. The inspectors reviewed the report to ensure that issues

identified were consistent with the NRC perspectives of licensee performance and to verify if any significant safety issues were identified that required further NRC follow-up.

b. Findings

No findings of significance were identified.

.2 TI 2515/161 - Transportation of Reactor Control Rod Drives in Type A Packages

a. Inspection Scope

The inspector completed Phase I of the subject TI. The inspector interviewed cognizant personnel and determined that Susquehanna had undergone refueling activities between January 1, 2002, and the present, but had not made any shipments of Class 7 (Radioactive) control rod drives.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On January 13, 2006, the resident inspectors presented the inspection results to Mr. R. Pagodin, General Manager - Nuclear Engineering, and other members of your staff, who acknowledged the finding. No proprietary information is contained in this report and the inspectors did not retain any proprietary documents.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee Personnel

J. Helsel, Manager - Nuclear Operations
R. Sgarro, Manager - Regulatory Affairs
D. D'Angelo, Manager - Station Engineering
B. Rhoads, Manager - Plant Chemistry
G. Ruppert, Manager - Maintenance
V. Schuman, Manager - Radiation Protection
W. Morrissey, Supervising Engineer, Regulatory Affairs
J. Hirt, Supervisor, Reactor Engineering
R. Boesch, Supervisor - Operations Training
B. Stitt, Supervisor - Licensed Operator Requalification Training
F. Tarselli, Simulator Coordinator
J. Fritzen, Radiological Support Supervisor
S. Ingram, Senior Health Physicist - Dosimetry
J. Jessick, Health Physics Foreman
R. Kessler, Health Physicist - ALARA

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

| | | |
|---|---|---|
| 05000387, 05000388/2005005-01 | NCV | Inadequate Foreign Material Exclusion Procedural Instructions associated with EDG work |

Closed

| | | |
|---|---|---|
| 05000388/2005004-00 | LER | Common Mode Failure of the Inboard "A" and "B" Loop RHR Shutdown Cooling Testable Check Valves Due to Vibration-Inducted Seat Damage |
| 05000388/200505-00 & 01 | LER | Reactor Automatic Scram due to a Main Generator Lockout |

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

**Section 1R04: Equipment Alignment**

SO-024-013, Offsite power source and onsite class 1E, Rev 14
SO-150-002, Quarterly RCIC Flow Verification, Rev. 33
SO-150-001, Monthly RCIC Alignment Check, Rev. 11
SO-149-001, Monthly RHR valve alignment check, Rev. 15
Drawing M -151, Residual Heat Removal - Sheets 3 & 4, Rev. 19
OP-218-001, Instrument Air System Normal Operations, Rev. 26
ON-218-001, Loss of Instrument Air, Rev. 19

**Section 1R06: Flood Protection Measures**

PCWO 701105
PCWO 717338
AR 717338
FSAR Section 2.4.2, Hydrologic Engineering - Floods
FSAR Section 3.4, Water Level (Flood) Design
IN 2002-12, Submerged Safety-Related Electrical Cables
NE-94-001, Section 5.2, Susquehanna IPE for External Events - Floods

**Section 1R12: Maintenance Effectiveness**

Maintenance Rule Basis Document:

System 24 - Diesel Generators
System 34K - Reactor Building Chilled Water
System 55 - CRD Control Rod Drive Hydraulics
System 62 - Reactor Vessel and Auxiliaries

System Health Reports:

System 24 - Diesel Generators
System 34K - Reactor Building Chilled Water
System 55 - CRD Control Rod Drive Hydraulics

AR 676754
AR 640725
AR 728440
AR 730006

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

SGTS Recirculation Plenum notebook
PSP-26, ORAM-EOOS Program, Rev. 2
Technical Specifications 3.6.4.1 and 3.6.4.3, One-Time 48 Hour Allowable Outage Time for Secondary Containment and Standby Gas Treatment System

RWLO 709198, Recirculation Plenum Entry for Recirculation Fan Discharge Damper Actuator Replacement
AR 716140, Standby Gas Treatment System (SGTS) Replacement Readiness Review

**Section 1R15: Operability Evaluations**

Drawing FF105801 , standby generator set control diagram, Sheet 5001

**Section 1R16: Operator Work-Arounds**

AR 734351
AR 622122
AR 676754
AR 683004

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

SO-070-001, Monthly Standby Gas Treatment, Rev. 15
SE-150-001, 24 Month RCIC System and Logic Functional Check, Rev. 11
FSAR Section 5.4.6
SO-152-002, Quarterly HPCI Flow Verification, Rev. 39
SM-102-001, 125 Volt DC Station Batteries Weekly Electrical Check, Rev. 11
Work Instruction 665225
WO 733538 and WO 733539
IC-024-001, Electronic Tune-up Procedure for Diesel Generator Governor “A”, “B”, “C”, and “D”
OP-024-001, Diesel Generators, Rev. 44

**Section 1R20: Refueling Outage**

Risk Assessment for U1 Maintenance Outage, Rev. 0
October 2005 Maintenance Outage Readiness Review, October 25, 2005
GO-100-002, Plant Startup, Heatup, and Power Operations
GO-100-005, Plant Shutdown to Hot and Cold Shutdown, Rev. 34
GO-100-006, Cold Shutdown, Defueled and Refueling, Rev. 31
SO-100-011, Reactor Vessel Temperature and Pressure Recording, Rev. 15
OP-102-002, Operation of 125VDC Common Load Manual Transfer Switches, Rev. 12
SO-150-004, Quarterly RCIC Valve Exercising, Rev. 25
SE-100-002, ASME Class I Boundary System Leakage Test, Rev. 17

**Section 1R22: Surveillance Testing**

NDAP-QA-0722, Surveillance Testing Program, Rev. 11
EC-069-1011, Bounding Value of Drywell Sump Level Switch/Sump Volume
SO-100-006, Shiftly Surveillance Operating Log, Rev. 47
EC-069-1010, Bounding Value of Drywell Sump Level Switch/Sump Volume
SO-200-006, Shiftly Surveillance Operating Log, Rev. 41

**Section 1R23: Temporary Plant Modification**

MT-GM-085, Operation of Portable EHC Fluid Conditioning Equipment, Rev. 0
AR 724674
AR 721987

**Section 2OS: Occupational Radiation Safety**

Action Reports (AR)

705136, 696635, 694575, 693418, 686576, 691033, 688940, 644142, 690409, 714953

Radiation Work Permits 2005-5103, 2005-5151

Susquehanna Steam Electric Station National Voluntary Laboratory Accreditation Program Onsite Assessment Reports for 2003 & 2005

Personnel Dosimetry Performance Testing Report, January 9, 2004

Audit 575218, Personnel Thermoluminescent Dosimeter (TLD) Processing Program, July 2004

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

Semi-Annual Trend Review

| | | | | | |
|---|---|---|---|---|---|
| AR 689421 | AR 691417 | AR 691764 | AR 692600 | AR 693145 | AR 694191 |
| AR 696070 | AR 714581 | AR 721174 | AR 725131 | AR 729085 | AR 729235 |
| AR 729841 | | | | | |

Annual Sample Review

NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Rev. 3
NDAP-QA-0413, Maintenance Rule Program, Rev 7
NDAP-QA-0401, Emergency Diesel Generator Reliability Maintenance Program, Rev. 3
NDAP-QA-0503, General Housekeeping and Foreign Material Exclusion, Rev. 10
NRC Reg Guide 1.16, Monitoring the Effectiveness of Maintenance at Nuclear Power Plants
NRC Reg Guide 1.182, Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants
System 024 EDG Health Reports - Second Period 2005, First Period 2005, Third Period 2004
CR674151, Root Cause Analysis, Rev 0
AR 675151
OPS-05-09, Review/Peer Check 'C' D/G Apparent Cause Investigation/Action Plan

**LIST OF ACRONYMS**

| | |
|---|---|
| ALARA | As Low As Is Reasonably Achievable |
| AR | Action Report |
| ASME | American Society of Mechanical Engineers |
| CEDE | Committed Effective Dose Equivalent |
| CFR | Code of Federal Regulations |

| | |
|---|---|
| CR | Condition Report |
| EDG | Emergency Diesel Generator |
| FME | Foreign Material Exclusion |
| FSAR | [SSES] Final Safety Analysis Report |
| HCU | Hydraulic Control Unit |
| HPCI | High-Pressure Coolant Injection |
| KV | Kilovolts |
| LDE | Lens Dose Equipment |
| LER | Licensee Event Report |
| NCV | Non-cited Violation |
| NDAP | Nuclear Department Administrative Procedure |
| NRC | Nuclear Regulatory Commission |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| PCWO | Plant Component Work Order |
| PI | [NRC] Performance Indicator |
| PI&R | Problem Identification and Resolution |
| PPL | PPL Susquehanna, LLC |
| RB | Reactor Building |
| RCA | Radiologically Controlled Area |
| RCIC | Reactor Core Isolation Cooling |
| RCS | Reactor Coolant System |
| RHR | Residual Heat Removal |
| SDE | Skin Dose Equivalent |
| SDP | Significant Determination Process |
| SSES | Susquehanna Steam Electric Station |
| TEDE | Total Effective Dose Equivalent |
| TLD | Thermoluminescent Dosimeter |