August 3, 2007

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000387/2007007 AND 05000388/2007007

Dear Mr. McKinney:

On June 29, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Susquehanna Steam Electric Station. The enclosed inspection report documents the inspection findings, which were discussed on June 29, 2007, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design basis accidents. The inspection also reviewed Pennsylvania Power and Light's (PPL) response to selected operating experience issues. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents two NRC-identified findings both of which were of very low safety significance (Green). The findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of the findings and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any of the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. 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, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspectors 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, 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 component of NRCs 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/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-387, 50-388
License No. NPF-14, NPF-22

Enclosure: Inspection Report 05000387/2007007 and 05000388/2007007
w/Attachment: Supplemental Information

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REGION I

Docket Nos.:	50-387, 50-388
License Nos.	NPF-14, NPF-22
Report Nos.	05000387/2007007 and 05000388/2007007
Licensee:	Pennsylvania Power and Light
Facility:	Susquehanna Steam Electric Station
Location:	Berwick, Pennsylvania
Dates:	May 21 to June 29, 2007
Inspectors:	K. Mangan, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader P. Finney, Reactor Inspector, DRS J. Krafty, Reactor Inspector, DRS H. Balian, Resident Inspector, Salem Nuclear Generating Station, Division of Reactor Projects (DRP) G. Newman, Reactor Inspector, DRP (Trainee) H. Anderson, NRC Mechanical Contractor G. Skinner, NRC Electrical Contractor
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000387/05000388/2007007; 05/21/2007 - 06/29/2007; Susquehanna Steam Electric Station; Component Design Bases Inspection. The report covers the Component Design Bases Inspection conducted by a team of four NRC inspectors and two NRC contractors. Two findings of very low risk significance (Green) were identified, both were considered to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings.

Cornerstone: Mitigating Systems

- GREEN. The team identified a non-cited violation of 10 CFR 50 Appendix B, Criterion III, Design Control, in that Pennsylvania Power and Light (PPL) did not ensure that quality standards such as applicable regulatory requirements were specified and included in design documentation and that deviations from such standards were controlled. PPL did not identify that a modification performed to the emergency safeguards service water (ESSW) pump house resulted in the RHR system not meeting 10 CFR 50, Appendix A, Criterion 34, related to single failure criteria. Specifically, the team reviewed a modification performed on the ESSW pump house, in 2002, that removed a door from the building exterior. PPL had identified, in 1990, they did not meet the single failure requirements because the RHR system could fail following a loss of one train of ventilation in the ESSW pump house. To correct the deficiency PPL created a procedure to provide alternate ventilation to the room in the event of a failure of the ventilation system which included opening the door removed by the 2002 modification. Additionally, the team also reviewed a November 2005 condition report identifying that the temporary ventilation procedure was unusable. However, no corrective actions were performed. Following the team's identification of the issue PPL took immediate corrective actions to establish a new ventilation path.

  The finding is more than minor because it is associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that there was no actual loss of safety function and the finding screened as having very low safety signicance (Green). The finding has a cross-cutting aspect in the area of Problem Identification and Resolution - Corrective Actions Program. (Section 1R21.2.1.1) (IMC0305, aspect P.1. (d))

  GREEN. The team identified a non-cited violation of Pennsylvania Power and Light (PPL) Technical Specification 5.4.1, Administrative Controls, Procedures, for failure to

follow procedures required by Regulatory Guide 1.33. Specifically, an operator did not use a procedure designated ‘step by step’ to verify switch alignment when substituting the ‘E’ emergency diesel generator (EDG) for the ‘C’ EDG as required by PPL administrative procedures. PPL entered this issue into the corrective action program for resolution.

The finding is more than minor because it affected the human performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability and reliability of mitigating systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as having very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance - Work Practices. (Section 1R21.2.2.1) (IMC 0305, aspect H.4 (6)

B. Licensee-identified Violations.

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the Susquehanna Steam Electric Station (SSES) Probabilistic Risk Assessment (PRA) and the U.S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model. Additionally, the SSES Significance Determination Process (SDP) Phase 2 Notebook, Revision 2, was referenced in the selection of potential components and actions for review. In general, the selection process focused on components and operator actions that had a Risk Achievement Worth (RAW) factor greater than 2.0 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were located within both safety-related and non-safety related systems, and included a variety of components such as turbines, pumps, breakers, fans, generators, transformers, and valves. The components selected involved at least 8 different plant systems.

The team initially compiled a list of 40 components and 10 operator actions based on the risk factors previously mentioned. The team performed a margin assessment to narrow the focus of the inspection to 20 components and 5 operator actions. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment included items such as failed performance test results, corrective action history, repeated maintenance, maintenance rule (a)1 status, operability reviews for degraded conditions, NRC resident inspector input of equipment problems, system health reports and industry operating experience. Consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins. The margin review of operator actions included complexity of the action, time to complete action, and extent of training of the action.

The inspection performed by the team was conducted as outlined in Inspection Procedure 71111.21. This inspection effort included walk-downs of selected components, interviews with operators, system engineers and design engineers, and reviews of associated design documents and calculations to assess the adequacy of the components to meet design bases, licensing basis and beyond design basis requirements. A summary of the reviews performed for each component, operator action, operating experience sample, and the specific inspection findings identified are discussed in the following sections of the report. Documents reviewed for this inspection are listed in the attachment.

.2 Results of Detailed Reviews

.2.1 Detailed Component Design Reviews (20 Samples)

.2.1.1 Engineered Safeguards Service Water Pumphouse Ventilation

a. Inspection Scope

The team inspected the engineered safeguards service water (ESSW) pump house ventilation system to ensure it could meet its required support function for the residual heat removal service water (RHRSW) and emergency service water (ESW) pumps, motors, and motor control center (MCC) it is designed to cool. The team conducted a walkdown of the system, interviewed the system engineer, and reviewed condition reports in order to assess the material condition of the system and verify that issues were being appropriately addressed in the corrective action program. The team reviewed drawings, calculations, and the ESSW motor qualification test report in order to determine if the ESSW motors located in the pumphouse could perform their safety function when exposed to the expected maximum temperatures during design bases accidents. Procedures were reviewed to verify that the actions specified during a failure of one division of ESSW pumphouse ventilation were in agreement with the pump room heat up calculation. The team reviewed 50.59 screenings, and safety evaluations associated with the ESSW pumphouse modification to verify that the changes to the facility were properly reviewed and documented in accordance with 10 CFR 50.59.

b. Findings

Introduction: The team identified a non-cited violation (NCV) of 10 CFR 50 Appendix B, Criterion III, Design Control, in that Pennsylvania Power and Light (PPL) did not ensure that quality standards such as applicable regulatory requirements were specified and included in design documentation and that deviations from such standards were controlled. Specifically, PPL did not identify that a modification performed to an emergency safeguards service water (ESSW) pump house resulted in the residual heat removal (RHR) system not meeting 10 CFR 50, Appendix A, Criterion 34, related to single failure criteria.

Description: The team reviewed a modification performed in 2002 on the ESSW pump house that removed one of the exterior doors and replaced it with a block wall. In November 2005, a condition report (CR) was written identifying that the modification re-introduced a single failure potential in the RHR system. Specifically, the site identified that if ventilation was lost to the Division 2 side of ECCS pump house, due to failure of the motor control center (MCC) supplying the ESSW ventilation system, one train of emergency service water (ESW) and one train of residual heat removal service water (RHRSW) could fail causing the loss of 3 of 4 RHR pumps in both units (6 of 8 total). During some design basis events, this would result in one of the units not having an RHR pump to use for cooldown and suppression pool cooling because the A EDG would have to supply the two remaining RHR pump motors but only has the capacity to supply one pump motor at a time. This single failure potential had been previously identified in

1991 and corrected by creating an operator action which opened doors in the pump house to provide a ventilation path in the event of a loss of the MCC. This path was lost when the door was removed.

The team performed a walkdown and reviewed design basis information to assess the licensing basis for the operator action. The pump house, divided into two rooms, contains the pumps and motors for both divisions of ESW and both divisions of RHRSW that supply cooling water to the RHR systems and emergency diesel generators (EDGs) for both units. The team determined that a modification performed in 1985 re-piped the emergency service water (ESW) system. In 1988, PPL identified that, due to this modification, a loss of one division of ESSW ventilation would result in only one loop of suppression pool cooling being available for both units. The engineering work request (EWR) performed to correct the issue recommended revising operating procedures to manually open ESW pump house dampers within five hours of a LOOP and ventilation failure. Additionally, the EWR recommended updating the final safety analysis report (FSAR) to describe and credit the action. In 1990, a licensee self-assessment again recommended revising operation procedures to open dampers in the ESSW pump house during a loss of one division of ventilation. Subsequent to this report procedure EO-000-031, Station Power Restoration, was revised to open doors in the ESSW pump house in the event of a ventilation failure. Additionally, in 1998, during the Current Licensing Basis Project, PPL identified that the FSAR had not been updated and operator actions were not incorporated into all required procedures.

The team questioned the adequacy of the operability determination performed to address the 2005 CR and the lack of corrective actions to address the deficiency. PPL's operability assessment in the 2005 CR concluded that the deficiency was a nonconformance with the design basis of the residual heat removal system, but not an operability concern because the ventilation system was working and no MCC failure had occurred. The team's review determined that PPL previous actions to establish the ventilation lineup procedure were necessary to restore the units to compliance. The approved safety analysis report credited that the licensee met the requirements of 10 CFR 50 Appendix A, Criterion 34, which states that the RHR system shall be designed to be available with an assumed single failure. Additionally, the team determined PPL never updated the FSAR to reflect the change in licensing basis. Because the operator action was not achievable, the team questioned if the required support system for RHR system was operable. Following questions from the team, PPL took immediate corrective actions to create a natural circulation path by blocking open normally closed dampers in the pump house building and corrected deficiencies identified by the team in the implementing procedure.

Analysis: The team determined that PPL's failure to ensure that the design basis of the RHR system was maintained during the ESSW pump house modification was a performance deficiency that was reasonably within PPL's ability to foresee and correct. The finding is more than minor because it is associated with the design control attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC Inspection

Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At Power Situations," the team conducted a Phase 1 SDP screening. The team found the finding was a design deficiency that could impact operability; however, since there was no actual failure of the MCC power supply for the ESSW ventilation system there was no actual loss of safety function, and it was not potentially risk significant due to external events initiators. Therefore, the issue screened as having very low safety significance (Green).

The finding has a cross-cutting aspect in the area of Problem Identification and Resolution - Corrective Actions Program because PPL did not take appropriate corrective action to address safety issues in a timely manner. Specifically, in November 2005, PPL identified that they were outside their design basis yet no temporary or corrective actions had been taken prior to June 7, 2007. (IMC 0305, aspect P.1 (d))

Enforcement 10CFR50 Appendix B, Criterion III, Design Control, requires, in part, that measures to assure quality standards such as applicable regulatory requirements are specified and included in design documentation and that deviations from such standards are controlled. Contrary to the above, PPL did not identify that a modification performed, in 2002, to an emergency safeguards service water (ESSW) pump house resulted in the RHR system not meeting the 10CFR50, Appendix A, Criterion 34, related to single failure criteria. Because this violation is of very low safety significance, PPL took immediate corrective action and entered the issue in the corrective action process (CR 883500), this violation is being treated as a non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000387;05000388/2007007-01 Inadequate ESSW Pumphouse Ventilation Lineup)**

.2.1.2 Ultimate Heat Sink

a. Inspection Scope

The team reviewed design basis calculations, procedures, and associated documentation regarding the inspections, evaluations, surveillances, maintenance, and corrective actions for the Ultimate Heat Sink (UHS). This included the spray pond, spray arrays, associated spray array and bypass valves and logic, and the pump house structure. The review was performed to assess the maintenance of the design basis capabilities and features of the UHS. In addition, the team walked down the spray pond area and pump house structure to assess the physical configuration and material condition of the pond, pump house, and associated structures. Additionally, the team reviewed design basis calculations such as heat transfer capability, maximum water loss, water impurity concentration factor and chemical controls related to the prevention of plate out on heat exchanger surfaces, water inventory, and sediment depth via periodic inspections and accumulation rate history. The review focused on the ability of the UHS to be available for design basis events. Finally, the team reviewed design basis calculations, surveillance procedures, and surveillance records regarding minimum pond level requirements and maximum pond temperature limitations to determine required pond inventory. The team verified the inventory was adequate to

account for heat dissipation and sufficient pond level was available to provide required net positive suction head (NPSH) for, and prevent vortexing of, the RHRSW and ESW pumps. The team reviewed PPL's determination of the spray pond Technical Specification (TS) temperature limit, the uncertainty in the temperature alarm and temperature indicator measurements, and the procedural requirements for monitoring the alarm and indicator to verify they were adequate to ensure UHS operability.

b. Findings

No findings of significance were identified.

.2.1.3 Emergency Service Water Pump Motor, 0P504A

a. Inspection Scope

The team inspected the ESW pump motor to verify that it could meet its design basis requirements. The team reviewed the ESW pump motor initiation logic, and elementary wiring diagrams to verify that the system control logic was consistent with the design bases. The team reviewed load flow calculations and undervoltage relay calculations to verify the motor would have adequate voltage to start and run under postulated accident conditions. The team also reviewed motor feeder breaker relay setting calculations to determine whether the ESW pump motor was adequately protected, and whether the supply breaker was coordinated with upstream breakers. Finally, the team reviewed equipment qualification documentation to determine whether the motor could operate under postulated abnormal environmental conditions, and performed a walkdown of the motor to assess materiel condition and the presence of potent physical hazards to the equipment.

b. Findings

No findings of significance were identified.

.2.1.4 Residual Heat Removal Pump, 1P202D

a. Inspection Scope

The team inspected the residual heat removal (RHR) pump to verify that the pump could meet the design basis requirements. The inspection included a review of associated support features such as room ventilation cooling, pump motor cooling, and pump minimum flow provisions. The inspection consisted of a walkdown of the pump and associated support features, discussions with the system and design engineers, and a review of RHR pump health reports and conditions reports to assess the material condition. The team also reviewed the TS, the Updated Final Safety Analysis Report (UFSAR), the RHR Design Basis Document (DBD), and design bases calculations to determine the required flows, pressures, and operating conditions for various system configurations. The team evaluated calculations, technical evaluations, pump curves, condition reports, and inservice test (IST) data to ensure that TS and design basis

required flows and pressures could be achieved, NPSH and vortex protection requirements were met, and that IST acceptance criteria were appropriate. The team also reviewed the licensee's response to NRC Bulletin 88-04 to verify that the RHR pumps were not subject to failure from inadequate minimum flow or dead-heading from a parallel higher head RHR pump.

b. Findings

No findings of significance were identified.

.2.1.5 RHR Suction Strainer

a. Inspection Scope

The team inspected a RHR suction strainer as a representative sample to ensure it could meet its design function. The team reviewed the results of suppression pool cleanings and inspections and the calculations for debris generation inside containment as a result of a loss-of-coolant accident (LOCA). The review was used to verify that the values chosen for the rate of sludge buildup in the suppression pool and the additional debris expected as a result of a LOCA were in accordance with Regulatory Guide 1.82 - Water Sources for Long Term Recirculation Cooling Following a Loss-of-Coolant Accident. The team reviewed the results of the testing of the RHR suction strainer to verify that the strainer would not affect the ability of the RHR system to perform its safety function as a result of debris loading resulting from a LOCA. Finally, the team interviewed system and design engineers, and reviewed condition reports and system health reports to verify that system issues were being appropriately addressed in the corrective action program.

b. Findings

No findings of significance were identified.

.2.1.6 Suppression Pool Cooling Test Control Valve and Suppression Chamber Spray Test Shutoff Valve, HV-151F024B and HV-251F028A (2 samples)

a. Inspection Scope

The team inspected the suppression pool cooling test control valve and suppression chamber spray test shutoff valve to verify they could operate during design basis events. The inspection included interviews with system and design engineers and reviews of drawings, calculations, and dynamic test results to verify that the design basis for the operation of the valves were correctly documented and the analysis used the maximum differential pressure expected during operation. The team reviewed periodic verification test results to verify that the motor operated valves (MOV) continued to be capable of performing their safety function and that torque switch settings were correct in accordance with GL 89-10. The team reviewed MOV design standard documents and periodic performance assessment calculations to verify that changes in valve

performance due to degradation were properly identified and used to determine test frequency in accordance with GL 96-05. Finally, the team reviewed condition reports and system health reports to determine the overall health of the system, and determine if issues entered into the corrective action program were appropriately addressed.

b. Findings

No findings of significance were identified.

.2.1.7 Reactor Core Isolation Cooling Pump, 1P203

a. Inspection Scope

The team inspected the reactor core isolation cooling (RCIC) turbine driven pump and associated support features including room ventilation cooling, lube oil cooling, pump minimum flow provisions, steam supply, and suction switchover instrumentation to verify that the pump was capable of meeting its design basis requirements. The team interviewed system and design engineers, and walked down areas in the RCIC pump room and around the condensate storage tank (CST) to assess the physical configuration and material condition in these areas. The team reviewed the set points and supporting analyses for instrument loops designed to switchover suction of both the high pressure coolant injection (HPCI) system and the RCIC system from the CST to the suppression pool to verify the set points were appropriate to preclude air ingestion prior to completion of the switchover process. The team reviewed aspects of the TS, the Updated Final Safety Analysis Report, the RCIC Design Basis Document, and design basis calculations to determine the required system flows, pressures, and operating conditions. The team evaluated calculations, technical evaluations, pump curves, condition reports, and IST data to ensure that TS and design basis required flow and pressure could be achieved, NPSH and vortex protection requirements were met, and that IST acceptance criteria were appropriate.

b. Findings

No findings of significance were identified.

.2.1.8 Turbine Building Closed Cooling Water Heat Exchanger, 1E123B

a. Inspection Scope

The team inspected the turbine building closed cooling water (TBCCW) heat exchanger to verify that the component was capable of handling its design basis heat load. The inspection consisted of a walkdown of the associated component, interviews with the design engineer, and a review of TBCCW heat exchanger documents. This included reviews of vendor specification sheets, heat load calculations, minimum flow calculations, tube plugging acceptance criteria, heat exchanger visual inspection

reports, and completed flow tests. The review was performed to verify the component had enough margin in flow and efficiency to cool its required loads when either normal cooling water or emergency service water was supplied to the heat exchanger.

b. Findings

No findings of significance were identified.

.2.1.9 Turbine Building Closed Cooling Water Temperature Control Valve, TV20946

a. Inspection Scope

The team inspected the TBCCW control valve to assure it could meet its design function. The team reviewed conditions reports, modification package documentation, design basis calculations, and air operated valve (AOV) program setup/test acceptance criteria and setup results for the Unit 2 TBCCW temperature control valve. The review was done to determine the valve's design basis requirements and verify they were adequately incorporated into the AOV program setup/test acceptance criteria for the valve. In addition, the team walked down the valve location to visually assess the physical configuration, installation, and material condition of the valve. The team reviewed condition reports related to the previously installed valve as well as the modification package for the currently installed valve. The team also reviewed the design basis calculations related to the pressure which the valve must open or close against, and the throttling conditions which the valve would experience in controlling TBCCW temperatures to verify that the setup/test criteria employed in testing the as-installed valve under the AOV program would ensure it would meet operational requirements during design basis events.

b. Findings

No findings of significance were identified.

.2.1.10 Inboard Main Steam Isolation Valve, HV-241F022C

a. Inspection Scope

The team inspected the 'C' inboard main steam isolation valve to ensure it could meet its design function. The team conducted interviews with system and design engineers, reviewed drawings, condition reports and system health reports in order to identify system problems and verify that issues entered into the corrective action program were appropriately addressed. The team reviewed program documents and calculations to determine the valve closing time requirements assumed in accident analyses with and without jet impingement on the valve. Finally, the team reviewed surveillance test results to verify that valve stroke times and local leak rate test results met design basis requirements and that acceptance criteria were appropriate to determine the valve was operable.

b. Findings

No findings of significance were identified.

.2.1.11 Emergency Diesel Generator, 0G501B

a. Inspection Scope

The team inspected the 'B' emergency diesel generator (EDG) jacket and lube oil coolers to verify that they were capable of removing the required heat loads during design basis events. The team performed a walkdown of the 'C' and 'E' EDG coolers and associated emergency service water piping and valves as being representative of the 'B' EDG equipment. Additionally, system and design engineers were interviewed to determine the material condition of the EDG. The team reviewed documentation of the results of eddy current tests and periodic cleaning of cooler tubes to verify the material condition of the tubes. The team reviewed the results of PPL's Generic Letter (GL) 89-13 program cooler visual inspections and periodic cleaning to verify the coolers were maintained at a level to assure design heat loads could be removed. In addition, the team reviewed calculation and flow balance results of the ESW system as it related to demonstration of required heat transfer capability of the EDG coolers. The team also reviewed the heat inputs to the evaluations of UHS capability to confirm these inputs were consistent with the heat removal requirements.

The team also inspected the capability of the 'B' EDG to supply electrical power to safety-related loads during design basis events. To assess the capability the team reviewed sequential, voltage drop, largest load, and full load reject calculations along with maintenance and surveillance records. The team also reviewed maintenance and surveillance records to ensure compliance with Technical Specifications on voltage and frequency. Finally, the team reviewed an evaluation of the EDG's frequency response during transients associated for loss-of-offsite power (LOOP) /LOCA loading with a replaced Woodward governor.

b. Findings

No findings of significance were identified.

.2.1.12 Diesel Generator 0G501C Output Circuit Breaker, 1A203-04 and 4KV Vital Bus 1A202 Feeder Breaker, 1A202-09 (2 samples)

a. Inspection Scope

The team inspected the diesel generator output breaker to verify it could meet its design requirements. The team reviewed control logic for the output breaker to determine whether diesel loading schemes would perform as described in the design bases documents and reviewed load flow calculations to determine whether the breaker was applied within its required ratings. The team also reviewed control logic for the feeder breaker to determine whether load shed, protective relaying, and bus transfer schemes

would perform as described in the design bases. The team reviewed 125 Vdc voltage drop calculations and vendor data to determine whether adequate control voltage was available to the breakers. The team reviewed maintenance procedures and schedules to determine whether they were consistent with vendor recommendations. The team reviewed maintenance history and corrective action documents and performed a walkdown of the equipment to assess their materiel condition of the equipment and presence of physical hazards which could impact breaker operation.

b. Findings

No findings of significance were identified.

.2.1.13 4kv Vital Bus, 1A201

a. Inspection Scope

The team inspected the 4kv vital bus to verify it could meet its design requirements. The team reviewed alternating current (AC) load flow calculations to verify that the 4.16kV system had sufficient capacity to support its required loads under worst case accident loading and grid voltage conditions. The team reviewed elementary wiring diagrams for bus feeder and load breakers to verify system control logic was consistent with the system design requirements stated in the FSAR and would respond as described in the design and licensing bases. The team also reviewed bus load protective and undervoltage relaying to verify adequate protection to the bus and equipment supplied by the bus, and determine if any adverse interactions within the protection scheme could reduce system or offsite power reliability. The team reviewed system operating procedures to determine whether they were adequate to assure reliable sources of power to the buses, and to determine whether the results of design calculations and modifications had been properly incorporated. Finally, the team reviewed system health data, corrective action documents and performed walkdowns of the switchgear to assess materiel condition and presence of hazards that could adversely effect equipment operation.

b. Findings

No findings of significance were identified.

.2.1.14 Tie Bus A0107 Differential Lockout Relay, 86A1-107

a. Inspection Scope

The team inspected the tie breaker differential lockout relay to verify the relay scheme was in accordance with the design bases. The team reviewed system operating procedures to determine whether they were consistent with the design requirements of the relay scheme. The team reviewed protective relays including the bus over current and differential schemes to verify they were properly designed to afford bus protection while avoiding spurious tripping. This review included review of relay technical manuals,

setting sheets, setpoint calculations, calibration schedules, and results to verify periodic maintenance was consistent with vendor recommendations and risk importance. Finally, the team reviewed maintenance and corrective action history to determine whether there were any adverse equipment performance trends.

b. Findings

No findings of significance were identified.

.2.1.15 Automatic Transfer Switch, 0ATS516

a. Inspection Scope

The team inspected the automatic transfer switch to verify it was in accordance with the design bases. The team reviewed 480 Vac system one line diagrams, vendor drawings and technical manuals to verify the transfer switch installation was consistent with system operating requirements. The team reviewed system operating and surveillance procedures to determine whether proper switch function was periodically verified. The team also reviewed preventive maintenance schedules and vendor manuals to verify periodic maintenance was consistent with vendor recommendations and risk importance. In addition, the team reviewed maintenance and corrective action history to determine whether there were any adverse equipment performance trends.

b. Findings

No findings of significance were identified.

.2.1.16 125 Vdc Battery Charger, 2D613

a. Inspection Scope

The team inspected the battery charger to verify that its sizing would satisfy the requirements of the risk significant direct current (DC) loads and that the minimum voltage was taken into account. Specifically, the evaluation focused on verifying that the battery charger was adequate to supply the design duty cycle of the 125 Vdc system for the loss-of-coolant accident/loss-of-offsite power and station blackout (SBO) loading scenarios, and that adequate voltage would remain available for the individual load devices required to operate during a four-hour SBO coping duration. In addition, a walkdown was performed to visually inspect the physical condition of the battery and battery chargers, verify the charger was properly aligned and the panel indicated acceptable voltage and current. The team interviewed design and system engineers to determine design aspects and operating history for the battery charger. The team reviewed battery charger surveillance test results to verify that applicable test acceptance criteria and test frequency requirements specified for the battery were met.

b. Findings

No findings of significance were identified.

.2.1.17 250 Vdc Battery, 1D660

a. Inspection Scope

The team inspected the battery to verify that the battery sizing would satisfy the electrical requirements of the risk significant loads and that the minimum possible voltage was taken into account. Specifically, the evaluation focused on verifying that the battery was adequately sized to supply the design duty cycle of the 250 Vdc system for the SBO loading scenario, and that adequate voltage would remain available for the individual load devices required to operate during a four-hour SBO coping duration. This included verification that all procedurally operated loads were accounted for in calculations that verified margin. In addition, a walkdown was performed to visually inspect the physical condition of the battery. During the walkdown, the team also visually inspected the battery for signs of degradation such as excessive terminal corrosion and electrolyte leaks. The team reviewed battery surveillance test results to verify that applicable test acceptance criteria and test frequency requirements specified for the battery were met. The team also interviewed design and system engineers to determine design aspects and operating history for the battery.

b. Findings

No findings of significance were identified.

.2.1.18 125 Vdc Load Center, 2D622

a. Inspection Scope

The team inspected the 125 Vdc load center to verify that its loading was within equipment ratings and that the minimum voltage was taken into account. Additionally, electrical separation between class 1E and non-1E loads was verified to meet design requirements. The team reviewed the DC calculations to verify that the load center's associated battery and battery charger would satisfy the requirements of the risk significant loads. The team also reviewed ground detection design and site procedures for ground isolation in the ungrounded 125 Vdc system. In addition, a walkdown was performed to visually inspect the physical condition of the load center. The team interviewed design and system engineers to determine design aspects and operating history for the load center.

b. Findings

No findings of significance were identified.

.2.2 Detailed Operator Action Reviews (5 samples)

The team assessed manual operator actions and selected a sample of five operator actions for detailed review based upon risk significance, time urgency, and factors affecting the likelihood of human error. The operator actions were selected from a PRA ranking of operator action importance based on RAW and RRW values. The non-PRA considerations in the selection process included the following factors:

- Margin between the time needed to complete the actions and the time available prior to adverse reactor consequences;
- Complexity of the actions;
- Reliability and/or redundancy of components associated with the actions;
- Extent of actions to be performed outside of the control room;
- Procedural guidance; and
- Training.

.2.2.1 Operator Aligns 'E' Diesel Generator

a. Inspection Scope

The team inspected the operator action to manually align the 'E' EDG to supply emergency power to one of four 4,160 Vac emergency buses during a station blackout event. The team reviewed PPL's PRA and human reliability studies to determine when and how quickly the 'E' EDG was credited with energizing an emergency bus for various initiating event scenarios. The team walked down areas outside the control room where equipment was required to be operated to ensure that equipment was available, and environmental conditions (e.g., lighting, habitability) would allow for the personnel to perform the steps. To evaluate the ability of operators to perform the actions, the team interviewed operators and training personnel. Additionally, the team observed an alignment of the 'E' EDG as substitute for the 'C' EDG to verify procedural direction was adequate to perform the alignment and could be performed within the assumed time constraints of the PRA analysis.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of Susquehanna Steam Electric Station (SSES) Technical Specification 5.4.1, Administrative Controls, Procedures, for failure to follow procedures required by Regulatory Guide 1.33, when substituting the 'E' emergency diesel generator (EDG) for the 'C' EDG.

Description: On May 23, 2007, the team observed PPL Nuclear Plant Operators (NPO) substitute the 'E' emergency diesel generator (EDG) for the 'C' EDG in order to remove the 'C' EDG from service and make the 'E' EDG available for standby operations. The operation was performed by an NPO while a second NPO provided peer-checking. Additionally, the on-shift Field Unit Supervisor (FUS) was in the area and provided oversight during portions of the evolution. The operators were provided procedure OP-

024-004, Transfer and Test Mode Operations of Diesel Generator 'E', by the control room staff to perform the EDG swap. The team noted that the procedure directs operators to use procedure OP-024-001, Diesel Generators, to complete the lineup; however, this procedure was not provided to the NPO by the control room staff. This procedure provides three pages of procedural direction to verify the alignment of the 'E' EDG for standby operation.

When the operators were directed to use the procedure, the team observed that the NPOs did not use a copy of procedure OP-024-001 to perform the alignment. After the substitution was complete, the team asked the FUS if it was acceptable to not have the attachment in-hand when performing the switch alignment. The FUS responded that switch lineup could be performed without referring to the procedure.

The team reviewed the procedure and found that it was classified as a "Step-By-Step" procedure. The team reviewed PPL's administrative procedure NDAP-QA-0029, Procedure Use Standards and Expectations. The procedure was created to meet the requirements of Regulatory Guide 1.33, related to the quality assurance of operating procedures. The procedure defines the adherence level regarding how rigorously a procedure must be used and followed when conducting an activity. The requirements for Step-By-Step adherence include: the procedure must be in the procedure user's presence, shall be referred to for each step before performing the step, and the operator must use place-keeping techniques. The team concluded that proper procedure adherence was not used and that multiple barriers to ensure procedural compliance had failed. This included control room staff failing to provide a copy of the procedure to the operator, the operator failure to use the procedure in the field even though a copy of the procedure was available in the room, and the supervisor failing to acknowledge or correct the deficiency after being questioned by the NRC team. The issue was entered into PPL's corrective action program for resolution (CR 880806).

Analysis: The team found that failure to use procedure OP-024-001, Diesel Generators, was a performance deficiency. The finding is more than minor because it affected the human performance attribute (human error pre and post event) of the Mitigating Systems Cornerstone and the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. This finding was evaluated by the significance determination process of Inspection Manual Chapter (IMC) 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations" and was found to be of very low safety significance (Green) because the finding did not result in inoperability or loss of function to a system. This finding has a cross-cutting aspect in the area of Human Performance, Work Practices, because personnel did not follow procedures. (IMC 0305, aspect H.4 (b))

Enforcement: PPL Technical Specification 5.4.1, Administration, requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, Quality Assurance Program Requirements (Operation), Revision 2, Appendix A, Item 1.d. lists an administrative procedure covering procedure

adherence as a typical procedure for operating nuclear reactors. PPL procedure NDAP-QA-0029, Procedure Use Standards and Expectations, Rev. 5, requires that applicable procedures be followed to the prescribed level of adherence at all times. For procedures assigned a Step-By-Step adherence level, NDAP-QA-0029 requires that the procedure be in the presence of the person performing the task, place-keeping, and referral to each procedural step prior to performing the action. Contrary to the above, on May 23, 2007, PPL operators did not properly use an EDG procedure which is classified as a Step-by Step procedure. Specifically, while substituting the 'E' EDG for the 'C' EDG, operators did not use procedure OP-024-001 to ensure the 'E' EDG was aligned for standby automatic operation. Because this finding is of very low safety significance and has been entered into the corrective action program (CR 880806), this violation is being treated as an NCV, consistent with section VI.A of the NRC Enforcement Policy. **(NCV 05000387;05000388/2007007-02, Failure to Use 'E' EDG Procedure)**

.2.2.2 Operators Aligns Instrument Air to Supply Containment Instrument Gas

a. Inspection Scope

The team inspected the operator action to manually align the instrument air (IA) system to supply the containment instrument gas (CIG) system to prevent closure of the inboard main steam isolation valves (MSIV) following a loss or failure of both CIG compressors. The team reviewed the PPL's probabilistic risk assessment (PRA) to determine when the action was credited. The team interviewed operators and training personnel, and walked down plant areas to evaluate the ability of operators to perform necessary actions, and identify unforeseen operator challenges. Additionally, the team observed a simulator scenario to verify that the control room would issue orders to operators in the plant in time to prevent an MSIV closure. Finally, the team reviewed calculations and assumptions used in determining the time before inboard MSIVs begin to close following loss of CIG pressure to verify that sufficient time was available to perform the action.

b. Findings

No findings of significance were identified.

.2.2.3 Operator Connects Fire Service System to Residual Heat Removal Service Water System for Low Pressure Injection

a. Inspection Scope

The team inspected the operator action to manually connect the fire service (FS) system to the RHRSW system. To evaluate the ability of operators to perform all necessary actions, the team interviewed operators and training personnel and walked down the plant areas where operators would be required to perform the procedure to identify unforeseen operator challenges and verify that actions could be performed. Additionally, the team verified that equipment required to perform the task was properly

staged. Finally, the team reviewed calculations and assumptions used in determining that this action would supply sufficient water inventory to the vessel post accident in order to prevent core damage.

b. Findings

No findings of significance were identified.

.2.2.4 Operator Connects Portable Diesel Generator to 125 Vdc Battery Chargers

a. Inspection Scope

The team inspected the operator action to manually connect a portable diesel generator to the four 125 Vdc battery chargers. The team found that PPL calculations credited the ability of operators to align the portable diesel generator and energize the required 125 Vdc battery charger within six hours of a loss-of-offsite power and failure of all four EDGs. To evaluate the ability of operators to perform all necessary actions, the team interviewed operators and training personnel. Additionally, the team observed a simulated connection of the portable diesel generator to the 125 Vdc battery chargers to determine the time period required to perform the action and if required equipment was properly staged. The team reviewed maintenance practices associated with diesel generator and inspected the equipment to assess its material condition. Finally, the team walked down the plant areas where operators would perform required tasks to identify unforeseen operator challenges.

b. Findings

No findings of significance were identified.

.2.2.5 Operator Manually Operates Motor Operated Valves to Align Residual Heat Removal

a. Inspection Scope

The team inspected the operator action to manually operate several RHR system motor operated valves (MOV). These actions enable the RHR system to fulfill its design function despite a loss of electrical power. To evaluate the ability of operators to perform all necessary actions, the team interviewed operators and training personnel. The team reviewed calculations and assumptions regarding accessibility to RHR system MOVs during accident conditions. Finally, the team walked down the plant areas where operators would perform required tasks to identify unforeseen operator challenges and verify the actions could be properly performed.

b. Findings

No findings of significance were identified.

.2.3 Review of Industry Operating Experience (OE) and Generic Issues (4 Samples)

a. Inspection Scope

The team reviewed selected Operating Experience (OE) issues that had occurred at domestic and foreign nuclear facilities with apparent applicability to SSES. The team performed a detailed review of the OE issues listed below to verify that SSES had appropriately assessed potential applicability to site equipment, and, if required, the actions taken to address the OE were effective in correcting or preventing the issue from occurring at the site.

NRC Bulletin 80-11: Masonry Wall Design

The team reviewed the applicability and disposition of NRC Bulletin 80-11. The NRC issued this bulletin to request that licensees perform a reevaluation of masonry walls which were in proximity to or had attachments to safety-related equipment. Specifically, the team reviewed the qualification for the installation of component boxes in the 125Vdc/250Vdc battery rooms, in support of the float current shunt modification, to verify the installations met the seismic reevaluation criteria and that the block wall maintained its seismic qualifications.

NRC Information Notice (IN) 2002-015: Hydrogen Combustion Events at Foreign BWRs

The team reviewed the applicability and disposition of IN 2002-015 and IN 2002-015, Supplement 1, Potential Hydrogen Combustion Events in BWR Piping. The IN 2002-015 and its supplement were concerned with the possibility of explosive quantities of hydrogen gas accumulation in system piping from the radiolytic dissociation of water. The team reviewed PPL's identification and evaluation of piping susceptible to hydrogen accumulation. This review included verification of piping arrangements by reviewing system drawings to confirm that the susceptibility criteria of IN 2002-015 were adequately considered.

NRC Information Notice 98-24, Stem Binding in Turbine Governor Valves in Reactor Core Isolation and Auxiliary Feedwater Systems.

The team reviewed PPL's evaluation and subsequent activities in relation to NRC Information Notice 98-24, Stem Binding in Turbine Governor Valves in RCIC and Auxiliary Feedwater Systems, to confirm the thoroughness and adequacy of the licensee's activities. The review included the licensee's evaluation in condition report (CR) 75988 and the work performed under Unit 1 Work Order 103139 and Unit 2 Work Authorization P81049. Specifically, the team reviewed PPL's actions to replace the RCIC turbine governor valve stem on Unit 1, and to replace the valve stem carbon washers with washers having appropriate larger diameter openings on both units. Additionally, the team reviewed summaries of actions completed to address procurement, documentation, and spare parts program controls. The review was performed to verify non-conforming spare valve stems would not be utilized as

replacement stems, and valve stem documentation and drawings contained the correct valve dimensions and tolerances.

NRC Information Notice (IN) 2006-22 - New Ultra-Low-Sulfur Diesel Fuel Oil Could Adversely Impact Diesel Engine Performance

The team reviewed the potential of low and ultra-low sulfur diesel fuel oil to degrade onsite risk-significant diesel equipment. The review included a fuel oil tank walkdown, interviews with onsite and corporate personnel as well as a review of PP&L's engineering evaluations of the potential effects of low sulfur diesel fuel oil. The team ensured that the unloading process and associated chemical analyses used were sufficient to identify the sulfur concentration of fuel oil in a timely manner.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed a sample of problems that were identified by the licensee and entered into the corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design or qualification issues. In addition, CRs written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

4AO6 Meetings, Including Exit

Exit Meeting Summary

On June 29, 2007, the team presented the inspection results to Mr. McKinney, Chief Nuclear Operator - Susquehanna Steam Electric Station, and other members of PPL's staff. The team verified that no proprietary information is documented in the report.

ATTACHMENT

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000387;388/2007007-01	NCV	Inadequate ESSW Pumphouse Ventilation Lineup (Section IR21.2.1.1)
05000387;388/2007007-02	NCV	Failure to Use 'E' EDG Procedure (Section IR21.2.2.1)

Discussed

None.

KEY POINTS OF CONTACT

Licensee Personnel:

B. McKinney	Chief Nuclear Operator
M. Mjaatredt	Manager, Design Engineering
R. Pagodin	General Manager, Nuclear Engineering
C. Gannon	Vice President, Nuclear Operations
P. Brady	Supervisor, Electrical I&C Design
E. Miller	Nuclear Regulator Assurance
M. Chaiko	Senior Staff Scientist, Mechanical
J. Maertz	Supervisor, System Engineering Mechanical Group
J. Helsel	Manager, Operations
D. Kostelnik	Supervisor, Mechanical Design

NRC Personnel

C. Cahill	Region 1 Senior Risk Analyst
A. Blamey	Senior Resident Inspector
F. Jaxheimer	Resident Inspector

LIST OF DOCUMENTS REVIEWED

Calculations

EC-SOPC-0598, Relay Setting Calculation for Diesel Gen A(B,C,D) V Resistor TOC at Buses 1A & 2A (1B & 2B, 1C & 2C, 1D & 2D), Rev. 0
EC SOPC-0597, Relay Setting Calculations for Diesel Generator ABCD Sync, Rev. 1
EC-SOPC-0534, Relay Setting Calculation for TR 101 (111, 201, 211) CB Syn Check at Buses 1A, 1D, 2A, & 2D (1B, 1C, 2B & 2C); 1A, 1D, 2A, & 2D (1B, 1C, 2B & 2C), Rev. 0
EC-SOPC-0738, Relay Setting Calculations for TR101 (111, 201, 211) CB OC at Buses 1A, 1D, 2A & 2D (1B, 1C, 2B, & 2C), Rev. 1
EC-004-1002, LOCA Time Line Development for Plant Voltage Studies, Rev. 7
EC-004-1031, Plant AC Load Flow Analysis, Rev. 0
EC-006-0002, MCC Control Circuits Voltage Drop Calculation, Rev. 0
EC-006-0003, 480V MCC Control Circuit Transformer Selection, Rev. 1
EC-VALV-0504, Degraded Grid Analysis for Generic Letter 89-10, Rev. 10
EC-006-0504, Voltage Drop Calculation for GL-89-10 Auto Initiated MOVs, Rev. 29
EC-SOPC-0673, Tie Bus 106 Diff; Tie Bus 107 Diff Location 0A10303 0A10403, Rev. 0
EC-004-0502, Operation of Class 1E Distribution System at Degraded Grid Undervoltage Relay Setpoint - EC1, EG1. EH1, EH2 - During Design Basis Accidents, Rev. 4
EC-006-0553, Review & Reanalyze Design of Circuits with Agastat 7014 &7024 Realy EK AC Power Distribution Load Studies EH4, EH8 480V AC Class 1E U1 & U2 Misc. Calcs., Rev. 0
EC-017-0639, Evaluation of the Class 1E 120VAC Circuits with Degraded Grid Voltage, Rev. 2
EC-017-0640, Evaluation of the Class 1E 120VAC Circuits with a Degraded Grid and the Class 1E 480/120VAC Transformer Taps Set at 456/120, Rev. 2
EC-004-1010, Unit 1 and Unit 2 Degraded Grid Voltage Study, Rev. 2
E-DAR-025, Agastat Relays 7014/7024, Rev. 0
E-DAR-026, Agastat 4 Pole Relays (7014 & 7024), Rev. 0
EC-004-0513, Plant Test - TP3.70 - Verification of NRC Branch Technical Position PSB-1 Requirements AC Power Distribution Load Studies, Rev. 0
EC-004-1018, Plant Electrical Model - EK1 - 1999 Revision, Rev. 0
EC-004-0516, Documentation Bases for the 1992 Plant Voltage Study Update EK1 AC Power Distribution Load Studies, Rev. 0
EC-017-0639, Evaluation of Class 1E 120VAC Circuits with Degraded Grid Voltage, Rev. 2
EC-017-0515, 120VAC Load Study and Voltage Drop Analysis for Circuit 2Y216-20, Rev. 5
EC-017-0552, Chiller Oil Heater Sizing and Current Draw 1Y23604 and 1Y24604, Rev. 1
EC-017-0545, 120VAC Class 1E Unit 2 Utilization Voltage Calc, Rev. 1
EC-004-0537, Design Basis for 41.6KV Degraded Grid Protection, Rev. 0
EC-013-1865, Cross-Tie from Fire Protection to RHR for Alternate Low Pressure Makeup to the Reactor Pressure Vessel
PA-B-NA-044, Susquehanna PSA Initiating Events Notebook, Rev. 1
EC-032-1014, SSES Yard Lighting Illumination Level, Rev. 0
EC-013-0504, Fire Water Supply to Reactor: Flow Rate vs. Reactor Pressure and Level, Rev. 1
EC-025-0010, Capacity of Instrument Gas Bottles, Rev. 0
EC-THYD-1039, Loss of Drywell Coolers, Rev. 0
EC-059-0542, Primary Containment Heat Sinks & Masses, Rev. 0

EC-006-0504, Voltage Drop Calculation for GL 89-10 Auto Initiated MOVs, Rev. 29
EC-012-2505, Reevaluation of Existing Masonry Walls, Rev. 0
EC-012-2516, Reevaluation of Existing Masonry Walls Phase III Loading, Rev. 0
EC-015-0502, Establish Design Flow and Heat Load for TBCCW System and the TBCCW Heat Exchanger Tube Plugging Limit, Rev. 3
EC-016-0556, NPSH Calculation for RHRSW Pumps, Rev. 0
EC-054-0514, Vortexing Evaluation of the RHRSW and ESW Pumps, Rev. 0
EC-054-0538, NPSH Calculation for ESW Pumps, Rev. 0
EC-054-0560, Determine Minimum ESW Flow Required to TBCCW Heat Exchanger for ESW Flow Balance, Rev. 0
EC-STRU-2007, Qualification of Blockwall in Control Building at Elev. 771' for addition of new component boxes with 125VDC/250VDC Battery Current Shunt, Rev. 1
EC-012-0500, Surface Area of Steel in Unit 1 Wetwell, Rev. 0
EC-028-1003, Establish an Upper Boundary for Ambient Temperature that is Reasonable and Conservative for Electrical Equipment Located in the ESSW Pumphouse, Rev. 0
EC-049-0590, MOV Data Detail Calculation for HV151F024B, Rev. 13
EC-049-0609, MOV Data Detail Calculation for HV251F028A, Rev. 7
EC-049-1038, Maximum Thrust and Seismic Analysis for MOV Limiting Component Analysis for HV151F028A/B and HV 251F028A/B, Rev. 3
EC-049-1049, Supplement to Report R93.036 for MOV Limiting Component Analysis for HV-151F024A, Rev. 0
EC-054-0514, Vortexing Evaluation of the RHRSW and ESW Pumps, Rev. 0
EC-054-0532, ESSW Pumphouse Transient Temp Response to Ventilation Transients, Rev. 3
EC-059-1012, Evaluation of LOCA Generated Debris Effects on ECCS, Rev. 10
EC-059-1034, Test Report and Sizing Calculation for Core Spray and Residual Heat Removal Stacked Disk Suction Strainers, Rev. 0
EC-059-1035, Evaluation of Paint Debris on Core Spray and Residual Heat Removal Stacked Disk Suction Strainers, Rev. 0
EC-083-0524, MSIV Closure Dynamic Model, Rev. 1
EC-083-1001, Total Friction Limit for Inboard MSIVs, Rev. 3
EC-083-1047, Documentation of the MSIV Closure Model, Rev. 0
EC-CHEM-1001, Suppression Pool Sludge Quantification and Cleaning Freq. Evaluation, Rev. 5
EC-EQQL-0502, High Energy Line Break and Leak Analysis Summary for EQ, Rev. 3
EC-VALV-0508, Assessment of Elevated Temperature, Rev. 12
EC-VALV-0524, Calculation of Open Thrust for Flex Wedge Gate Valves, Rev. 1
EC-VALV-0535, SSES MOV Program – Valve Factor Justification, Rev. 2
EC-VALV-0536, MOV Stem to Stem Nut Coefficient of Friction, Rev. 2
EC-VALV-0538, MOV Rate of Loading, Rev. 2
EC-VALV-0569, Design Basis Development for Priority 1 Motor Operated Valves, Rev. 18
EC-VALV-1008, Combination of Inaccuracies, Repeatabilities, and Margins Associated With MOV Diagnostic Testing, Rev. 0
EC-VALV-1022, Periodic Performance Assessment of Generic Letter 89-10 Gate and Globe Valves, Rev. 23

EC-VALV-1025, Determine Acceptability of Current Use of Design Margin to Account Rate of

Loading and Determine Appropriate Value of Design Margin to be Used for Non-Testable MOVS, Rev. 1
EC-VALV-1052, Assessment of GL 89-10 MOVs with Respect to Potential Susceptibility to Open Direction Load Sensitive Behavior, Rev. 0
EC-VALV-1071, Design Method for Actuator Output Torque for SSES Safety Related Motor Operated Valves, Rev. 1
EC-VALV-1073, Actuator Sizing and Diagnostic Test Acceptance Criteria for GL 89-10 AC (Unit 1) Rising Stem MOVs, Rev. 25
EC-VALV-1076, Actuator Sizing and Diagnostic Test Acceptance Criteria for GL 89-10 AC (Unit 2) Rising Stem MOVs, Rev. 26
EC-VALV-1124, Set-Up Requirements for AOV Program Category 1 Valves, Rev. 22
EC-VALV-1128, Main Steam Isolation Valve (MSIV) AOV Program Design Bases: Safety Functions, Operating Scenarios, and Maximum Expected Differential Pressures (MEDP), Rev. 4
EC-VALV-1130, Dynamic Response Calculation for "Y": Type Main Stm. Isolation Valve, Rev. 5
E-AAA-607, Battery Charger Failure Alarm, Battery Monitors & Ground Detection Alarm Relays Setpoints Calculation, Rev. 00
EC-AA-0503, Voltage Drop Calculation for GL 89-10 DC MOVs, Rev. 17
EC-024-0503, Diesel Generator Load Calcuation, Rev. 15
EC-088-0503, Voltage Drop Calculation for 89-10 DC MOVs, Rev. 17
EC-088-0506, Class 1E 250 VDC Batteries - Battery Sizing and Battery Charger Sizing, Rev. 06
EC-004-0509, Units 1 & 2 Class 1E 4.16kV System Cable Losses for Calculation for Diesel Generators 0G501A,B,C,D & E Loading, Rev. 00
EC-002-1031, Unit 1 & Unit 2 125 VDC Battery Load Profile for Modified Performance Surveillance Test, Rev. 07
EC-002-0504, Unit 2 125 VDC System 2D620-2D623 ED1, Rev. 27
EC-002-0506, 125 VDC System - 1D610 Battery Load Profile, Battery Sizing, Short Circuit, 1D613 Battery Charging Sizing, Station Blackout, Other Calculations, Rev. 28
EC-002-0507, Unit 2 125 VDC System (2D610-2D613) ED1 Battery Load Profile, Rev. 32
EC-002-0633, 125 VDC Utilization Voltage and Load Profile for Ckt 1D62437, Rev. 00
EC-088-0523, 250 VDC Battery 1D660 Station Blackout Discharge Calculation, Rev. 03
EC-088-1010, Unit 1 & Unit 2 250 VDC Battery Profile for Service Duty Surveillance Test, Performance Surveillance Test & Modified Performance, Rev. 06
EC-088-1006, Battery 1D660 Load Profile, Rev. 05
EC-VALV-0504, Degraded Grid Analysis for Generic Letter 89-10, Rev. 10
EC-SOPC-0585, Relay Setting Calculation for DC Distr Panel 1D615, 1D625, 1D635, 1D645, 2D625, 2D635 & 2D645 CBS at DC LCS 1D612, 1D622, 1D632, 1D642, 2D612, 2D622, 2D632 & 2D642 Resp, Rev. 00
FF105804, Sht.4101, Loading Sequence Analysis for Diesel Generators, Rev. 01
FF105804, Sht.4201, Transient Frequency Response Calculations, Rev. 01
0109-0057-DLH1, Evaluation of SSES EDG Frequency Response During Design Basis LOOP/LOCA Transient Loading with Replacement Woodward 2301A Governor, Rev. 00
GDS-08, Design Standard for Station Blackout, Rev. 09
SEA-ME-310, Power Uprate System Impact Review Drywell Cooling System, Rev. 1

Surveillances

1E205A, RHRSW Heat Exchanger Inspection Report, performed 5/9/06
730683, 48 Month Channel B 2D620 - 125 VDC Battery Discharge Performance Test and Battery Charger Capability Test SM-202-B04, performed 03/16/07
730682, 48 Month Channel A 2D610 - 125 VDC Battery Discharge Performance Test SM-202-A04, performed 03/07/07
542250, 2D620 Channel B 125 VDC Battery Service & Battery Charge Test SM-202-B03, performed 03/08/05
645742, 1D660 - Div 2 250 VDC Battery Discharge Modified Performance Test SM-188-204, performed 03/19/06
EPRM 299924, 1D6623 6 Yr Installation and Maintenance Feeder Bkr to 1D165 250 VDC Turbine Building Control Center, performed 03/14/02
EPRM 460434, Perform 6 Yr Insp, Maint, and Test 250 VDC Spare LC Bkr (1D612-024), performed 02/14/04
EPRM 754795, Relay Calibrations - B Diesel Generator (0G501B), performed 01/16/07
PCWO 698438, Voltage Indication on 2D622, performed 08/09/05
PCWO 533941, 0G501B - Replace the 59-AB and 59-BC Relays, performed 01/25/05
RTPM 339755, Calibrate 125 VDC Undervoltage Relays, performed 06/06/02
SC-023-002-1, New Diesel Fuel Oil Receipt Analysis, Rev. 3, performed 05/14/07
SE-259-023, LLRT MSIV Penet #X-7C, Rev. 10, performed 4/5/07
SO-024-001, Monthly Diesel Generator Operability Test, Rev. 42
SO-284-003, Cold Shutdown Main Steam Isolation Vlv. Exercising, Rev. 22, performed 4/3/07
TRS 3.8.7, Battery Monitoring and Maintenance Program

Condition Reports

368337	876364	882034	883731*	884384*
397224	876737*	882318	883743*	884540*
437764	877726*	882526*	883820*	884608*
451997	877743*	882989*	883822*	884675*
472702	879631*	882990*	883889*	884976*
69301	880227*	883172*	883922*	884979*
730470	880452*	883206*	883969*	884980*
809691	880559*	883222*	883974*	885026*
825429	880562*	883225*	883977*	885061*
825431	880806*	883254*	883998*	885353*
856687	881038*	883500*	884046*	97-4058
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876316	882014*	883687*	884381*	

* NRC identified during this inspection

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Station Portable Diesel Generator Main Bill of Material

LIST OF ACRONYMS

AC	Alternating Current
AOV	Air Operated Valve
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
CIG	Containment Instrument Gas
CPT	Control Power Transformer
CST	Condensate Storage Tank
DBD	Design Basis Document
DC	Direct Current
ECCS	Emergency Core Cooling Systems
EDG	Emergency Diesel Generator
ESSW	Emergency Safeguards Service Water
ESW	Emergency Service Water
FS	Fire Service
FUS	Field Unit Supervisor
GL	Generic Letter
IA	Instrument Air
IMC	Inspection Manual Chapter
IN	Information Notice
IST	Inservice Testing
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
MCC	Motor Control Center
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
NCV	Non-cited Violation
NPO	Nuclear Plant Operator
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
OE	Operating Experience
PPL	Pennsylvania Power and Light
PRA	Probabilistic Risk Assessment
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
SBO	Station Blackout
SDP	Significance Determination Process
SSC	System, Structures and Components
SSES	Susquehanna Steam Electric Station
TBCCW	Turbine Building Closed Cooling Water
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
Vac	Voltage Alternating Current
Vdc	Volts Direct Current