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

November 19, 2010

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000387/2010007 AND 05000388/2010007

Dear Mr. Rausch:

On October 8, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed with you and other members of your staff on October 8, 2010.

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 involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents one NRC-identified finding that was of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this as a non-cited violation (NCV), consistent with Section 2.3.2 of the NRC's 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 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 Inspector at the Susquehanna Steam Electric Station. In addition, if you disagree with the cross-cutting aspect assigned to the finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I and the NRC Resident Inspector at Susquehanna Steam Electric Station.

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

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

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

Enclosure: Inspection Report 05000387/2010007 and 05000388/2010007
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

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/RA/

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.:	50-387, 50-388
License No:	NPF-14, NPF-22
Report No:	05000387/2010007 and 05000388/2010007
Licensee:	PPL Susquehanna, LLC
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	Berwick, Pennsylvania
Dates:	September 13, 2010–October 8, 2010
Inspectors:	S. Pindale, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader J. Richmond, Senior Reactor Inspector, DRS M. Orr, Reactor Inspector, DRS J. Brand, Reactor Inspector, DRS R. Fuhrmeister, Senior Reactor Inspector (part-time), DRS A. Patel, Resident Inspector, Hope Creek Generating Station (part-time) S. Spiegelman, NRC Mechanical Contractor J. Leivo, NRC Electrical Contractor
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000387/2010007, 05000388/2010007; 09/13/2010–10/08/2010; Susquehanna Steam Electric Station, Units 1 and 2; Component Design Bases Inspection.

The report covers the Component Design Bases Inspection conducted by a team of six NRC inspectors and two NRC contractors. One finding of very low risk significance (Green) was identified, which was also considered to be a non-cited violation. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects were determined using IMC 0310, "Components Within the Cross-Cutting Areas." 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.

NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criteria XI, "Test Control," in that PPL did not ensure that test results were documented and evaluated to verify that test requirements were satisfied. Specifically, PPL did not adequately evaluate the over-current trip setting test results for 125 Vdc circuit breaker 1D652-12 to ensure the results were within the established acceptance limits. PPL subsequently placed the breaker in-service with an as-left trip setting outside of the approved acceptance band. In response, PPL entered this issue into the CAP and determined there was sufficient margin to ensure breaker operability.

  The finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the operability, availability, and reliability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, because PPL did not ensure that complete, accurate, and up-to-date procedures and work packages were available and adequate to assure nuclear safety. Specifically, the procedure for DC breaker testing did not have adequate administrative controls to ensure that as-left test values were within the established acceptance criteria. (IMC 0310, aspect H.2(c)) (1R21.2.1.2)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, 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) Units 1 and 2 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 2.1a) was referenced in the selection of potential components and operator actions for review. In general, the selection process focused on components and operator actions that had a Risk Achievement Worth (RAW) factor greater than 1.3 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 pumps, breakers, heat exchangers, transformers, and valves.

The team initially compiled a list of components and operator actions based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection report (05000387/2007007 and 05000388/2007007) and excluded the majority of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 20 components, four operator actions, and three operating experience items. 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 also 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 insights, system health reports, and industry operating experience. Finally, 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 the action, and extent-of-training on the action.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns 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 basis, licensing basis, and risk-informed beyond design basis requirements. In addition, the team reviewed the impact of a recently implemented extended power uprate (EPU) on the design and operation of selected components to determine whether plant modifications or procedure/calculation changes were necessary; and that appropriate design margin was maintained. Summaries of the

reviews performed for each component, operator action, operating experience sample, and the specific inspection finding identified are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

.2 Results of Detailed Reviews

.2.1 Results of Detailed Component Reviews (20 samples)

.2.1.1 125 Vdc Battery Charger Circuit Breaker, 2D612-22

a. Inspection Scope

The team reviewed the design, testing, and operation of the 'A' 125 Vdc battery charger circuit breaker, 2D612-22, to determine whether the breaker could perform its design basis function. The team reviewed design calculations, drawings, and vendor specifications to evaluate the circuit breaker short circuit rating and the protective coordination scheme between battery charger 2D613, direct current (DC) load center 2D612, and battery 2D610, to verify the circuit breaker over-load capability provided adequate protection for postulated faults in the DC system. In addition, the team reviewed the impact of the recent EPU on the design and operation of the DC system to determine whether modifications, procedure changes, or calculation revisions were necessary.

The team reviewed vendor recommendations, industry standards, and PPL's inspection and maintenance procedures to determine whether breaker maintenance and testing was adequate to ensure reliable operation. The team compared as-found and as-left inspection and test results to established acceptance criteria to verify the breaker mechanical condition and over-current trip settings conformed to design basis assumptions and requirements. In addition, the team interviewed system and design engineers, and electrical maintenance technicians, and conducted a walkdown of DC load center 2D612, battery charger 2D613, and associated battery and battery bus 2D610 to independently assess the material condition, and determine whether the system alignment and operating environment were consistent with the design basis assumptions. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the circuit breaker and to asses PPL's capability to evaluate and correct problems.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criteria XI, "Test Control," in that PPL did not ensure that test results were documented and evaluated to verify that test requirements were satisfied. Specifically, PPL did not adequately evaluate the over-current trip setting test results for breaker 1D652-12 to ensure they were within the established acceptance limits and subsequently placed the breaker in-service with an as-left trip setting outside of the approved acceptance band.

Description: The team reviewed the most recent completed preventive maintenance (PM) work order (WO) 490731 for breaker 2D612-22 and identified several apparent weaknesses in procedure MT-GE-014, "DC Switchgear Inspection and Breaker Maintenance," Revision 16, including weaknesses in the evaluation of trip setting test results. Maintenance procedure MT-GE-014 required mechanical maintenance and mechanical and electrical testing every 6 years on General Electric type AK-2A-25-1 circuit breakers with EC-1 Series Trip Devices. Breaker testing included trip shaft trip-torque checks, contact resistance, and primary current trip tests. To further assess this issue, the team reviewed 12 completed breaker PMs performed over the last three years.

The team identified that, on February 8, 2010, breaker 1D652-12 was returned to service with the as-left long-time delay trip setting values of 81 and 84 seconds for the positive-pole trip unit and the negative-pole trip unit, respectively (WO 1044614), which exceeded the maximum allowed time of 79 seconds, as specified in the acceptance criteria table. In addition, one as-left short-time delay trip setting value was recorded as 0.037 seconds, which was less than the minimum allowed time of 0.24 seconds, as specified in the acceptance criteria table. The team noted that the recorded short-time delay trip value was unrealistically low, and may have been indicative of an incorrectly recorded value. PPL had not previously documented any evaluation of these issues. In response, PPL entered these issues into their CAP as condition report (CR) 1310042. In addition, PPL performed an operability determination and concluded that a 5 second delay in the long-time trip function would not adversely impact DC over-current coordination.

In 2008, breaker 2D642-22 was returned to service with as-left long-time delay trip setting values of 83 and 90 seconds (WO 869733). In 2008, procedure MT-GE-014 specified that the acceptance criterion for the test results was +/- 15 percent of the relay setting change notice value. However, the relay setting change notice did not specifically provide a value for either the long or short time delay. Maintenance technicians independently used the vendor time-current curves to evaluate test result acceptability in accordance with the version of MT-GE-014 in effect at that time. In 2009, procedure MT-GE-014 was revised and vendor's time-current curve values were translated into an acceptance criteria table to simplify evaluation of test results. The team noted that the 2008 recorded values would have been outside of the acceptable range specified in the 2009 acceptance criteria table. PPL had not previously documented any evaluation of this issue. PPL entered this issue into their CAP as CR 1310441. In addition, PPL performed an operability determination and concluded that an 11 second delay in the long-time trip function would not adversely impact DC over-current coordination. The team reviewed the operability determinations regarding the out of specification long-time delay trip settings and found PPL's conclusions reasonable.

The team also identified that procedure MT-GE-014 specified an incorrect acceptance range of 0.24 to 0.175 seconds for the short-time delay trip value, while the vendor time-current curves showed the correct acceptance range to be 0.24 to 0.6 seconds. The team noted that the incorrect acceptance value had existed in the procedure since February 2009, but PPL had not identified the discrepancy although the procedure had been completed for several breaker trip tests since February 2009. PPL concluded that

this acceptance criterion in procedure MT-GE-014 was incorrect, and entered this issue into their CAP as CR 1310042.

In addition to the as-left issues above, the team identified that 6 of the 12 breakers reviewed had recorded as-found trip setting values outside of the acceptable range. The team determined that in each instance, the as-found out-of-tolerance trip setting was for the long-time delay trip function which utilized an oil dash pot as the timing mechanism. PPL performed the 6 year breaker PMs only during plant outages, by replacing an installed breaker with one for which a PM was recently completed, then placing the just-removed breaker into a spare status. Then during the next outage, typically 1 to 3 years later, a PM is performed on the spare breaker and it is returned to service in a different load center location. The team noted that there were several different trip setting values for the various DC load center breakers. WOs tracked each breaker by serial number, but did not identify where the breaker had last been installed, or what trip setting values were last used. PPL technicians often had to adjust the trip settings to a different value, based on where a spare breaker would next be installed. Based on the level of detail in the work instructions and recorded WO remarks, the team could not determine whether a spare breaker's EC-1 trip unit had been adjusted to a different trip value, or whether the as-found readings were taken before or after the trip units were re-adjusted. PPL had not evaluated as-found breaker conditions (i.e., the recorded as-found trip settings) to determine whether any adverse trend existed. PPL entered these issues into their CAP as CR 1309002.

The team identified additional testing deficiencies, which included work instruction weaknesses with respect to how steps were performed or evaluated (e.g., no administrative controls for ambient temperature during testing, or lack of guidance regarding repetitive trip tests in a short time period). PPL entered these issues into their CAP as CR 1310638. PPL also identified a testing issue associated with 3 of the 12 breakers reviewed. Specifically, three breakers had the long-time delay setting verified by applying 3X the coil adjustment value (i.e., 3 X 125 percent of 200 = 750 amperes) instead of the required 3X coil rating value (i.e., 3 X 200 = 600 amperes). However, the test results, taken for a trip current of 750 amperes, were compared to acceptance criteria values for a trip current of 600 amperes. While no operability issue was identified, PPL entered this issue into their CAP as CR 1310638.

Analysis: The team determined that the failure to identify and correct an over-current trip setting that was outside of the established acceptance criteria prior to returning a DC circuit breaker to service was a performance deficiency that was reasonably within PPL's ability to foresee and prevent. The finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In addition, this issue was similar to NRC Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," Example 4.l, in that a safety-related circuit breaker was returned to service, but the trip setting was subsequently determined to be out of specification. Traditional enforcement does not apply because the issue did not have any actual safety consequences or

potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements.

In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," a Phase 1 SDP screening was performed and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, because PPL did not ensure that complete, accurate, and up-to-date procedures and work packages were available and adequate to assure nuclear safety. Specifically, the procedure for DC breaker testing did not have adequate administrative controls to ensure that as-left test values were within the established acceptance criteria. (IMC 0310, aspect H.2(c))

Enforcement: 10 CFR 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is performed in accordance with written test procedures and test results are documented and evaluated to assure that test requirements have been satisfied. Contrary to the above, between January 16, 2008, and October 8, 2010, PPL did not adequately evaluate DC circuit breaker test results to ensure that the test requirements had been satisfied. Specifically, on February 8, 2010, PPL performed a primary current trip test, in accordance with MT-GE-014, Revision 16, on safety-related DC circuit breaker serial number 258A3759-262-4, and subsequently placed that circuit breaker in-service as 1D652-12 with an as-left long-time delay trip setting that was outside of the established acceptance criteria. Because this violation was of very low safety significance (Green) and was entered into PPL's CAP (CR 1310042 and 1310441), this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy.
(NCV 05000387/2010007-001, 05000388/2010007-01, Inadequate Test Control of Safety Related DC Circuit Breakers)

.2.1.2 High Pressure Coolant Injection Pump, 2P204

a. Inspection Scope

The team inspected the high pressure coolant injection (HPCI) system pump to determine whether it could fulfill its design basis mission of delivering flow to the reactor vessel in the event of a postulated accident. The team interviewed the system engineer, and reviewed pump testing results and condition reports that had been written for the HPCI pump and steam turbine driver system to assess pump performance. The team walked down the HPCI pump and support systems to assess the material condition of the pump and support systems. The team also reviewed the impact of the minor leakby of the steam supply and stop valves on the turbine and barometric condenser, including actions that had been taken and/or proposed to mitigate the leakby. The team reviewed system flow calculations to evaluate the potential impact from the recently implemented

EPU. The Updated Final Safety Analysis Report (UFSAR) and Technical Specifications were reviewed to assure consistency between the pump parameters and the tested design basis flow and pressure. The results and corrective actions from in-service test trends were reviewed to ensure that the pump operation was within the specified parameters. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the HPCI pump and to assess PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.3 High Pressure Coolant Injection Steam Supply Valve, HV255F001

a. Inspection Scope

The steam supply valve for the HPCI turbine is a normally closed valve that opens along with the turbine stop valve to supply steam to the HPCI turbine. The team interviewed system engineers to evaluate recent corrective actions, root cause evaluations, operability assessments, and maintenance and replacement activities that had been taken and/or planned to curtail or eliminate valve leakby. The maintenance history of the valve, including in-service testing results and trend data, was reviewed to assess the valve's performance. The team walked down the steam supply valve to assess its material condition. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the valve and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.4 High Pressure Coolant Injection Lube Oil Cooling Water Valve, HV256F059

a. Inspection Scope

The team reviewed the testing records for HPCI valve HV256F059, which supplies cooling water to the HPCI lube oil cooler. The team interviewed the system engineer and valve engineer, and reviewed test performance records and maintenance history, to evaluate the valve's performance. The records were compared with flow requirements for the cooler as identified in design basis documents. The team also performed a walkdown of the valve to assess its material condition and to evaluate the environment at the valve location. In addition, the team reviewed corrective action documents to determine if there were any adverse trends associated with the valve and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.5 Emergency Service Water Pump, 0P504D

a. Inspection Scope

The team inspected the 'D' emergency service water (ESW) pump (OP504D) to determine whether it could fulfill its design basis function of delivering cooling flow to the associated heat exchangers and room coolers. The team interviewed the system engineer, and reviewed pump testing results and condition reports that had been written for the ESW pump to assess its performance. The team walked down the ESW pump, the pump motor, and the pump house to independently assess PPL's configuration control, the pump's operating environment, and its material condition. The team also observed portions of a pump surveillance test to assess pump performance. The team reviewed system flow calculations to evaluate the potential impact from the recently implemented EPU. The UFSAR and Technical Specifications were reviewed to ensure consistency between the pump parameters and the tested design basis flow and pressure. The results and corrective actions from in-service test trends were reviewed to ensure that the pump operation was within the specified parameters. In addition, the results from an on-going flow balance test were reviewed to ensure the pump could acceptably provide cooling to the appropriate loads.

The team reviewed the 4160 Vac system load flow calculations and motor nameplate and acceleration data to confirm that adequate voltage would be available at the motor terminals for design basis conditions. To evaluate the condition of the pump motor, the team reviewed data and trends from lube oil analysis and interviewed the engineers regarding equipment history. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the ESW pump and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.6 Control Rod Drive Pump, 1P132B

a. Inspection Scope

The team inspected the 1P132B control rod drive (CRD) pump to verify that it was capable of meeting its design basis requirements. The CRD pump is designed to provide high pressure injection water under certain postulated accident conditions.

The team reviewed various design calculations to verify the adequacy of the design. This review included the CRD system flow calculation and the pump net positive suction head calculation. The team also reviewed in-service testing procedures, acceptance criteria, and recent results to verify the current capability of the pump. The team interviewed system and design engineers, and reviewed the associated operating procedures to assess the operation and testing of the CRD pump. The team also performed a walkdown of the pump and associated equipment to assess the material condition of the equipment. The team also reviewed corrective action documents to

determine if there were any adverse trends associated with the CRD pump and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.7 Residual Heat Removal Service Water Pumps, 1P506A/B

a. Inspection Scope

The residual heat removal service water (RHRSW) system pumps (IP506A/B) were inspected to evaluate whether design basis flow and pressure would be provided from the pumps to the RHR heat exchangers. The team reviewed applicable portions of the UFSAR, the Technical Specifications, and calculations to identify the design basis requirements for the pumps. Surveillance test results were reviewed to verify pump performance criteria and performance were consistent with the design basis requirements. The team also assessed whether the recent EPU warranted changes to operating parameters and/or procedures associated with the RHRSW pumps. The team also reviewed net positive suction head and differential pressure calculations to ensure consistency with design basis requirements and in-service test results.

The team also reviewed the 4160 Vac system load flow calculations and motor nameplate and acceleration data to confirm that adequate voltage would be available at the motor terminals for design basis conditions. To evaluate the condition of the pump motors, the team reviewed data and trends from lube oil analysis; interviewed engineers regarding equipment history; and performed visual inspections to identify and evaluate the material condition as well as potential vulnerability to external hazards such as seismic interactions and flooding. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the RHRSW pumps and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.8 125 Vdc Battery, 2D610

a. Inspection Scope

The team reviewed the design, testing, and operation of the 'A' 125 Vdc battery, 2D610, to verify it could perform its design basis function to provide DC power to connected loads during normal, transient, and accident conditions, including station blackout (SBO) events. The team reviewed design calculations, including battery sizing, battery float and equalizing voltages, load profile studies, and voltage drop calculations, to evaluate whether the battery capacity was adequate for the equipment load and duration required by design and licensing requirements, and to assess whether adequate voltage was available to meet minimum voltage specifications for connected loads during worst case

loading conditions. In addition, the team reviewed the impact of the recent EPU on the design and operation of the battery system to determine whether modifications, procedure changes, or calculation revisions were necessary and properly performed.

The team reviewed battery maintenance and surveillance tests, including modified performance and service discharge tests and routine surveillance tests, to assess whether the testing and maintenance was sufficient and whether those activities were performed in accordance with approved procedures, vendor recommendations, industry standards, and design and licensing requirements. The team compared the service test and modified performance test load profiles to the load profile studies for the loss-of-coolant accident with a concurrent loss of off-site power, and the SBO design assumptions to verify the load testing enveloped the predicted worst case loading conditions. In addition, the team compared as-found test and inspection results to established acceptance criteria to evaluate the as-found conditions and assess whether those conditions conformed to design basis assumptions and regulatory requirements.

The team interviewed design and system engineers regarding the design, operation, testing, and maintenance of the battery. Finally, the team performed field walkdowns of the battery, battery charger, and associated distribution panels to independently assess the material condition of the battery cells and associated electrical equipment. Specifically, the team inspected the battery for signs of degradation, such as excessive terminal corrosion and electrolyte leaks, and assessed battery room temperature trends to determine whether the battery's temperature was within the specified design temperature range.

b. Findings

No findings were identified.

.2.1.9 Emergency Diesel Generator 480 Vac Motor Control Center, 0B516

a. Inspection Scope

The team reviewed the design, testing, and operation of the 'A' emergency diesel generator (EDG) 480 Vac motor control center (MCC), 0B516, to verify it could perform its design basis function to supply power to EDG support equipment during normal, transient, and accident conditions. The team reviewed load flow studies and bus loading calculations to assess whether the MCC was operated within its equipment ratings and in accordance with design and licensing bases assumptions. The team reviewed 480 Vac short circuit calculations to verify that protective devices were within their ratings. The team also reviewed circuit breaker trip setpoint coordination studies to determine whether equipment was protected and protective devices featured selective coordination. The team reviewed the automatic transfer switch scheme, which supplied the MCC to verify whether operation was within design and licensing basis assumptions. Additionally, the team reviewed maintenance and test procedures, preventive maintenance schedules, and associated acceptance criteria, to verify the MCC was being maintained in accordance with manufacturer recommendations and industry standards. In addition, the team reviewed the impact of the recent EPU on the design

and operation of the 'A' EDG MCC to determine whether modifications, procedure changes, or calculation revisions were necessary and properly performed.

The team performed a field walkdown of the MCC to independently assess the material condition and operating environment. During the walkdown, the team compared system alignments to design basis assumptions to verify the adequacy of PPL's configuration controls. Additionally, the team reviewed system health report and corrective action documents to determine if there were any adverse equipment operating trends associated with the MCC.

b. Findings

No findings were identified.

.2.1.10 4160 Vac Electrical Bus, 2A201

a. Inspection Scope

The team reviewed the loadflow and supporting calculations that established the electrical loading on the 4160 Vac switchgear for design basis events, to determine the adequacy of the loading margins and the voltages available to safety-related loads for design basis conditions. This included a review of PPL's evaluation of the impact of the recently implemented EPU on the 4160 Vac system. To determine the capability for providing adequate voltage to safety-related loads at all distribution system voltage levels under degraded voltage conditions, the team reviewed the calculations that established the degraded voltage protection settings and the voltages at load terminals and MCC control power circuits. The team reviewed the governing agreements and procedures in place for PPL and the offsite transmission operator to confirm the minimum acceptable switchyard voltage assumptions. The team also reviewed the system short circuit calculations to assess the margins associated with equipment short circuit ratings. The team reviewed selected schematic diagrams for the 4160 Vac bus transfer schemes to ensure design basis functional requirements were satisfied.

The team reviewed the preventive maintenance results and refurbishment activities for the circuit breakers associated with the preferred sources to Bus 2A201 (20101 and 20109) to confirm that the activities were consistent with vendor manual specifications and that as-found conditions were properly dispositioned. The team reviewed 4160 Vac system health reports and the corrective action history, and interviewed the system engineer regarding equipment operating experience to evaluate component performance.

The team also performed equipment walkdowns to evaluate external material condition as well as potential vulnerability to hazards, such as post-accident radiation dose effects on protective relays in the switchgear room, seismic interactions, and flooding.

b. Findings

No findings were identified.

.2.1.11 Reactor Building Closed Cooling Water Heat Exchanger Temperature Control Valve, TV11028

a. Inspection Scope

The team inspected the Unit 1 reactor building closed cooling water temperature control valve (TV 11028) to ensure the valve was capable of performing its design function. The team reviewed the valve operating logic and completed tests to verify valve controls would function to provide the desired response to a demand signal. The team interviewed system and design engineers to ensure appropriate assumptions had been used in associated valve calculations. The valve capability calculations were reviewed to verify that the actuator settings were correct and based on appropriate design conditions. The UFSAR, Technical Specifications, design basis documents, and emergency procedures were reviewed to ensure that design and licensing bases assumptions were met. The team reviewed corrective action documents to determine if there were any adverse trends associated with the control valve and to asses PPL's capability to evaluate and correct problems. Finally, a walkdown was conducted to assess the material condition of the valve and to verify that the installed configuration would support its design basis function under transient and postulated accident conditions.

b. Findings

No findings were identified.

.2.1.12 Residual Heat Removal Service Water Valves: Loop 'B' Cross-tie, HV112F073B, and 'B' Heat Exchanger Discharge Isolation Valve, HV11215B (2 samples)

a. Inspection Scope

The team inspected two RHRSW motor-operated valves (MOV), the loop 'B' cross-tie to the residual heat removal (RHR) system (HV112F073B) and the 'B' RHR heat exchanger service water discharge isolation valve (HV11215B), to verify the valves were capable of performing their design basis functions. In addition to providing the cooling water for the RHR heat exchangers, the RHRSW system can also provide water to flood the reactor core or the primary containment after a postulated accident.

The team reviewed the UFSAR, the Technical Specifications, design basis documents, drawings, and procedures to identify the design basis requirements of each valve. The team reviewed periodic MOV diagnostic test results and stroke-timing test data to verify acceptance criteria were met. The team verified the MOV safety functions, performance capability, torque switch configuration, and design margins were adequately monitored and maintained for each MOV in accordance with NRC Generic Letter 89-10 guidance. The team reviewed MOV weak link calculations to ensure the ability of the MOVs to

remain structurally functional while stroking under design basis conditions. The team verified that the valve analysis used the maximum differential pressure expected across the valves during worst case operating conditions. Additionally, the team reviewed motor data, degraded voltage conditions, and voltage drop calculation results to confirm that the MOVs would have sufficient voltage and power available to perform their safety function at degraded voltage conditions.

The team discussed the design, operation, and maintenance of the MOVs with engineering staff to evaluate performance history, maintenance, and overall component health of the MOVs. The team also conducted walkdowns of both MOVs to assess the material condition and to verify the installed configurations were consistent with the plant drawings, design, and licensing basis. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the valves and to asses PPL's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.13 Residual Heat Removal Pump Room Cooler, 1E230B

a. Inspection Scope

The team inspected RHR pump room cooler 1E230B to verify that it was capable of meeting its design basis requirements. The room unit coolers are designed to reject heat from the air to the essential service water (ESW) system during normal, transient, and postulated accident conditions.

The team reviewed the room cooler's specifications, design bases information, and supporting calculations to identify the heat removal requirements and cooling capability. Recently completed thermal performance test results were reviewed to ensure adequate heat transfer capability was maintained for the room cooler. The room cooling fan sizing and power availability were reviewed to verify the reliability, availability, and capability of the forced air flow required for room cooling. The team interviewed system and design engineers to determine if there were any recent issues with the heat exchanger and to verify the results of periodic heat exchanger inspections. The team reviewed corrective action documents to determine if there were any adverse trends associated with the room cooler and to asses PPL's capability to evaluate and correct problems. Finally, a field walkdown was performed with the system engineer to assess material condition and verify that the system configuration was consistent with the design basis assumptions, system operating procedures, and plant drawings.

b. Findings

No findings were identified.

.2.1.14 Portable (Blue Max) Diesel Generator, 0G503

a. Inspection Scope

The team reviewed loading calculations to determine whether the portable diesel generator had sufficient capacity and capability to supply the required loads, and whether it could perform within the voltage and frequency limits required by the supplied loads. The team reviewed the generator grounding and associated output circuit breakers to determine whether faults would be properly isolated, without adversely affecting other supplied loads. The team reviewed maintenance schedules, procedures, and completed work records to determine whether the portable diesel generator was being properly maintained. The team reviewed completed tests to determine whether the diesel was being tested in accordance with the Technical Requirements Manual. The corrective action history, maintenance rule assessments, and performance criteria were reviewed to determine whether there had been any adverse operating trends associated with the portable diesel generator. The team also reviewed corrective action documents to asses PPL's capability to evaluate and correct problems. Finally, the team performed a visual inspection of the portable diesel generator and its environs to assess material condition and the presence of hazards.

b. Findings

No findings were identified.

.2.1.15 Manual Switch (DC Circuit No. 2 Power Selector), 0C521A-43-P-S2

a. Inspection Scope

This selector switch enables manual transfer of 125 Vdc control power for diesel generator 'A' to the Unit 2 battery if the Unit 1 source is not available. The team reviewed the schematic diagrams to assess circuit protection and potential vulnerability to undetectable or common cause failures involving the switch. To assess the adequacy of the transfer switch ratings, the team reviewed the vendor specifications and nameplate information provided by the licensee for continuous and interrupting ratings for the device, and reviewed schematics and calculations associated with the control power loads switched by the device.

The team reviewed component and CR history, procedures, and other design basis records to assess the reliability and condition of the switches and to determine if there were adverse trends in performance. For this switch and a similar switch in a redundant channel, the team visually inspected the switches and cabinet interior to evaluate material condition, circuit separation, and potential vulnerability to external hazards, such as seismic interactions.

b. Findings

No findings were identified.

.2.1.16 Emergency Diesel Generator, 0G501E

a. Inspection Scope

The team reviewed the electrical and mechanical design, testing, and operation of the 'E' EDG (0G501E) to verify it could perform its design basis function to provide reliable AC power to connected loads under transient and postulated accident conditions. The team evaluated the EDG load flow study and voltage drop calculations to assess whether adequate voltage was available to meet minimum voltage specifications for the safety-related electrical loads during worst case loading conditions. The team compared the load flow study uncertainties to the EDG's available margin to assess the load flow study adequacy. The team also reviewed static loading calculations to determine whether the maximum loading under postulated accident conditions was within the generator ratings. The team reviewed EDG surveillance test results, including the integrated loss-of-coolant accident/loss-of-offsite power load test, the 24-hour endurance run, and the 2 hour 110 percent rated load run, to verify the testing was performed in accordance with approved procedures and the test conditions enveloped design basis and Technical Specification requirements. In addition, the team reviewed the impact of the recently implemented EPU on the electrical design and operation of the 'E' EDG to determine whether modifications, procedure changes, or calculation revisions were necessary and properly performed.

The team inspected the EDG fuel oil, lube oil, starting air, jacket water, and ventilation and cooling systems to ensure they could support EDG operation. The team reviewed the UFSAR, the Technical Specifications, design basis calculations, vendor documents, and procedures to identify the design basis, maintenance, and operational requirements for the engine and systems. The team reviewed the design specification for the air start system, as well as air start test data and results to verify that the air start system was properly sized and could meet its design function for successive starts.

The team performed field walkdowns of the 'E' EDG to independently assess the material condition and the operating environment of the EDG and associated electrical equipment. During the walkdowns, the team compared local and remote EDG control switch positions, breaker position indicating lights, and system alignments to design and licensing basis assumptions to verify the adequacy of PPL's configuration controls. The team interviewed design and system engineers to evaluate past performance and operation of the EDG. Additionally, the team reviewed system health report and corrective action documents to determine if there were any adverse equipment operating trends.

b. Findings

No findings were identified.

.2.1.17 Containment Instrument Gas Compressor Inlet Isolation Solenoid Valve, SV-12605

a. Inspection Scope

The containment instrument gas (CIG) compressor inlet isolation solenoid valve is designed to de-energize to close to isolate CIG following a postulated accident. The team focused on the contribution of the component to the risk associated with an initiating event that could result from failure of the valve to remain open (energized). The valve must remain open to provide containment instrument gas for the main steam isolation valves (MSIV). Loss of the CIG system as a result of de-energizing the solenoid valve could lead to MSIV closure and a reactor scram as an initiating event, if operators did not cross-tie instrument air to CIG in sufficient time.

To identify additional devices and supporting circuits needed to ensure the valve remains open, the team reviewed the schematic diagrams for the solenoid valve circuits. To identify the estimated service life of the solenoid valve, the team reviewed the service life qualification data and analyses for the solenoid, rectifier, terminal block, and wiring. The team also reviewed the corrective action history for the component, including those in similar service. The team reviewed and discussed with engineers the safety basis for the component, and associated procedures for ensuring adequate reliability and service life. The team also performed a non-intrusive visual inspection of the solenoid valve to evaluate material condition; installation configuration; potential vulnerability to external hazards such as seismic interactions, moderate and high energy line breaks, and flooding; and conformance to electrical separation criteria.

b. Findings

No findings were identified.

.2.1.18 Time Delay Relay for Diesel Generator Circuit Breaker Closure, 95-1A20104

a. Inspection Scope

Following loss of the offsite (preferred) power source to the 4160 Vac bus, load shedding is initiated at a nominal 20 percent voltage setpoint. The time delay relay 95-1A20104 is used in the diesel generator circuit breaker control circuit to provide a nominal 0.5 second delay permissive for diesel generator breaker closure, to allow additional time margin for shedding of 4160 Vac bus loads if the diesel generator were running during the loss of the preferred source.

To determine the relay failure modes and effects on safety functions, as well as the capability for detecting failures of the relay, the team reviewed the associated logic and schematic diagrams, discussed the design basis for the relay with engineers, and reviewed the associated test procedures and reported results. The team reviewed design basis documents to confirm that relay operation and testing was in accordance with design requirements. The team also reviewed the corrective action and maintenance history for the relay, to determine if there were adverse trends in performance.

b. Findings

No findings were identified.

.2.1.19 Diesel Generator 'A' Breaker, 2A20104

a. Inspection Scope

The team reviewed the protection settings, supporting calculations, and selected tests for the breaker to assess the adequacy of electrical protection and the potential for premature breaker trip. The breaker is normally connected to the output of 'A' EDG, but can also be manually and procedurally aligned to 'E' EDG. The team reviewed the logic and schematic diagrams for control and electrical protection associated with the circuit breaker to confirm that design basis functional requirements were met, to confirm failure modes were identified and reviewed, and to assess the capability for detecting failures in the circuits. The team also reviewed and walked-through the 'E' EDG substitution configuration and procedure, and performed a visual inspection of the circuit transfer panel. The team also reviewed selected device ratings in the control circuits, to assess the capability for withstanding switching transients.

The team reviewed the preventive maintenance results and refurbishment activities for the breaker to confirm that the activities were consistent with vendor manual specifications and that as-found conditions were properly dispositioned, as necessary. To further assess equipment condition, the team reviewed the corrective action history associated with the breaker. The team also performed visual inspections to identify and evaluate external material condition as well as potential vulnerability to external hazards, such as vulnerability to post-accident radiation dose effects on protective relays in the switchgear room, seismic interactions, and flooding.

b. Findings

No findings were identified.

.2.2 Detailed Operator Action Reviews (4 samples)

The team assessed manual operator actions and selected a sample of four 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 RRW and RAW 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 to the operators; and
- Amount of relevant operator training conducted.

.2.2.1 Establish Manual Depressurization from the Main Control Room

a. Inspection Scope

The team reviewed the operator action to establish depressurization of the reactor vessel via manual actuation of the automatic depressurization system (ADS) to allow use of the low pressure emergency core cooling systems (ECCS) in response to transients such as an anticipated transient without scram (ATWS) and a small break loss-of-coolant accident (LOCA). The team reviewed PPL's PRA to determine how quickly the operators were credited with completing critical operator tasks for manually initiating the ADS valves from the control room. The team interviewed operators, training personnel, and the system engineer, and walked down the control room and relay rooms to evaluate the ability of operators to perform the necessary actions, and identify unforeseen operator challenges. The team reviewed the associated emergency and abnormal operating procedures to ensure the operators were provided with clear guidance to perform the action as credited in the design and licensing bases. In addition, the team observed two operating crews perform the action during separate simulator scenarios, and interviewed the operators on indications and responses, to assess operator knowledge of and ability to perform the required procedural actions.

b. Findings

No findings were identified.

.2.2.2 Operate an Automatic Depressurization System Valve from Upper/Lower Relay Room

a. Inspection Scope

The team reviewed the operator action to establish depressurization of the reactor vessel via manual actuation of ADS from the upper and lower relay rooms to allow use of low pressure ECCS in response to transients such as a small break LOCA combined with instrumentation failures (requiring ADS operation outside the control room). The team reviewed PPL's PRA to determine how quickly the operators were credited with completing critical operator tasks for manually initiating the ADS valves from the relay rooms. The team interviewed operators, training personnel and the system engineer, and walked down the upper and lower relay rooms and associated switches to evaluate the ability of operators to perform the necessary actions, and identify unforeseen operator challenges. The team reviewed the associated emergency and abnormal operating procedures to ensure the operators were provided with clear guidance to perform the action as credited in design and licensing bases. In addition, the team observed an operating crew perform the action during a simulator scenario, and interviewed the operators on indications and responses, to assess operator knowledge of and ability to perform the required procedural actions.

b. Findings

No findings were identified.

.2.2.3 Run Back Feedwater Following an Anticipated Transient Without Scram

a. Inspection Scope

The team reviewed the operator action to promptly reduce feedwater flow in a postulated ATWS event so that the reactor vessel level is lowered below the feedwater spargers. This action is required to prevent or mitigate core damage due to unstable operation due to high levels of core-inlet subcooling. The team reviewed the bases and assumptions used to determine the time required to take appropriate manual action. The team conducted interviews with operators to assess operator knowledge of and ability to operate applicable equipment, and to verify that the action could be accomplished in the required time. The team also performed a walkdown of the associated equipment to assess material condition. In addition, the team observed two operating crews perform the action during simulator scenarios, and interviewed the operators and training personnel on indications and responses, to assess operator knowledge of and ability to perform the required procedural actions. The team reviewed emergency and abnormal operating procedures to verify that the procedures provided clear steps to complete the manual action.

b. Findings

No findings were identified.

.2.2.4 Close the Main Steam Isolation Valves Following a Main Steam High Radiation Alarm

a. Inspection Scope

The team reviewed the manual operator actions to isolate the main steam isolation valves (MSIV) due to a high main steam radiation alarm. The team reviewed the bases and assumptions used to determine the time required to take appropriate manual actions. The team conducted interviews with operators to assess operator knowledge of the task and associated procedures to verify that the action could be accomplished in the required time. In addition, the team observed two operating crews perform the action during simulator scenarios, and interviewed the operators and training personnel on indications and responses, to assess operator knowledge of and ability to perform the required procedural actions. The team reviewed emergency and abnormal operating procedures to verify that the procedures provided clear steps to complete the required actions.

b. Findings

No findings were identified.

.2.3 Review of Industry Operating Experience and Generic Issues (3 samples)

The team reviewed selected operating experience issues for applicability at SSES. The team performed a detailed review of the operating experience issues listed below to verify that PPL had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.3.1 NRC Information Notice 2010-09, Importance of Understanding Circuit Breaker Control Power Indications

a. Inspection Scope

The team reviewed the applicability and disposition of NRC Information Notice (IN) 2010-09. The NRC issued this IN to alert licensees to issues with circuit breaker control power, as they related to the failure of a non-safety breaker to open at H.B. Robinson Steam Electric Plant on March 28, 2010. The team reviewed PPL's evaluation of the issue described in the IN. Specifically, the team reviewed PPL's CRs and actions documented to address this issue. The team interviewed plant personnel to discuss breaker control power design and indication to evaluate PPL's awareness of the issue. The team's review included daily operator logs, which require verification of control power availability.

b. Findings

No findings were identified.

.2.3.2 NRC Generic Letter 2007-01, Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients

a. Inspection Scope

NRC Generic Letter 2007-01 documented failures of safety-related cables and their associated systems at several sites due to long-term exposure to moisture. The letter requested licensees to submit the status of all cable failures for those cables in the scope that were inaccessible or underground, and requested a description of inspection, testing, and monitoring programs associated with these cables. The team reviewed PPL's response to the letter, and PPL's current inspection, testing, and monitoring programs.

To assess PPL's disposition of issues identified in Generic Letter 2007-01, the team selected the ESW and RHRSW pump motor feeder cables and reviewed associated documents, including: manhole, ductbank, and raceway drawings; the types of medium voltage cable insulation systems installed; the governing procedures and recent results associated with dewatering and inspection of manholes; procedures for cable and motor testing and trends for power factor test data; and relevant CRs or operating experience evaluations. The team also interviewed cognizant engineering staff regarding operating history, and performed a visual inspection of the medium voltage power cable conduits

serving the ESW and RHRSW pump motors in the ESW pumphouse to assess the potential for long term trapping of water in the conduits.

b. Findings

No findings were identified.

.2.3.3 10 CFR 21 Report Review Related to Timing Relay Defects

a. Inspection Scope

The team reviewed PPL's handling of reports of defects under 10 CFR 21 related to defects in Agastat timing relays. The team reviewed issues related to specific reports of incorrect recycle springs issued November 21, 2008, and hydrogen embrittlement of retaining rings issued June 16, 2010. The review was conducted to determine whether PPL had appropriately evaluated applicability of the reported issue to the facility and to preclude future procurement of the affected items. The team interviewed engineers and reviewed related corrective action program documents to evaluate PPL's awareness of the issues and their associated actions.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of problems that PPL had previously identified and entered into the CAP. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. 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.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

The team presented the inspection results to Mr. Timothy S. Rausch, Senior VP and CNO, and other members of PPL staff at an exit meeting on October 8, 2010. The team reviewed proprietary information, which was returned to PPL at the end of the inspection. The team verified that none of the information in this report is proprietary.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Adelizzi, Senior Engineer
K. Anderson, Senior Engineer
R. Bogar, Senior Engineer
P. Brady, Supervising Engineer
L. Casella, Senior Engineer
R. Centenaro, Senior Engineer
M. Chaiko, Senior Staff Engineer/Scientist
R. Collier, Senior Engineer
J. Fallbright, Senior Engineer
G. Fernsler, Shift Manager
D. Filchner, Senior Engineer
J. Folta, Senior Engineer
D. Gladey, Supervising Engineer
F. Habib, Senior Engineer
J. Jennings, Senior Engineer
A. Kissinger, Supervisor Operations Engineering
H. Koehler, Senior Engineer
D. Kostelnik, Supervising Engineer
A. Kuklis, Senior Engineer
J. Lada, Support Technology Specialist
G. Lubinsky, Senior Engineer
G. Machalick, Senior Engineer
W. Meltzer, Supervising Engineer
S. Muntzenberger, Senior Engineer
F. Negvesky, Senior Engineer
P. Phillips, Senior Engineer
D. Przyjemski, Senior Engineer
J. Rothe, Senior Engineer
L. Supon, Senior Engineer
R. Vazquies, Principal Engineer
T. Walters, Senior Engineer
L. West, Supervisor Corrective Action and Assessment

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

NCV	05000387;388/2010007-01	Inadequate Test Control of Safety-Related DC Circuit Breakers (Section 1R21.2.1.1)

LIST OF DOCUMENTS REVIEWED

Calculations and Evaluations:

1560-1CPS, Maximum Load Capacity of Pipe Support, Rev. 1
8856-M30-403-1, 'E' EDG Test Report, 1/6/77
EC-002-0507, 2D610 Master Battery Calculation, Rev. 38
EC-002-0602, 125 Vdc Utilization Voltage and Battery Load Profile for 2D614-14, Rev. 5
EC-002-0633, 125 Vdc Utilization Voltage and Battery Load Profile for 1D624-37, Rev. 0
EC-002-0644, 125 Vdc Utilization Voltage and Battery Load Profile for 1(2)D614-05, Rev. 5
EC-002-0647, 125 Vdc Utilization Voltage and Battery Load Profile for 1(2)D614-20, Rev. 3
EC-002-0659, 125 Vdc Utilization Voltage and Battery Load Profile for 1D614-14, Rev. 1
EC-002-0682, 125 Vdc Voltage Drop Analysis for Inverter 2D115 (2D614-30), Rev. 2
EC-002-1016, 125 Vdc Utilization Voltage and Battery Load Profile for 2D624-34, Rev. 2
EC-002-1023, 125 and 250 Vdc Battery Maximum Intercell Connection Resistances, Rev. 6
EC-002-1031, Battery Load Profile for Service and Modified Performance Tests, Rev. 11
EC-002-1066, 125 Vdc Battery Margin Study, Rev. 0
EC-004-0503, Degraded Grid Scheme Tolerance Calculation, EC1, Rev. 0
EC-004-0509, 4 kV System Cable Losses, Rev. 0
EC-004-0537, Design Basis for 4.16 kV Degraded Grid Protection, Rev. 1
EC-004-1002, LOCA Time Line Development for Plant Voltage Studies, Rev. 7
EC-004-1031, Plant AC Loadflow Analysis, Rev. 4
EC-004-1032, Voltage Impact to 13.8 kV Auxiliary Buses as a Result of EPU, Rev. 0
EC-004-1036, Plant AC Short Circuit Analysis, Rev. 0
EC-006-0002, MCC Control Circuit Voltage Drop Calculation, Rev. 1
EC-006-0503, Voltage Drop Calculation for GL 89-10 AC Manually Initiated Valves, Rev. 23
EC-006-1069, Calculation for Portable Diesel Generator 0G503, Rev. 0
EC-011-0007, Summary of Control Valve Sizing, Rev. 2
EC-012-3220, 'E' EDG Building Flood Analysis, Rev. 0
EC-014-0519, Establish ESW Flow Required to RVCCW HX – Post Loop (for EPU) Rev. 1
EC-016-0033, RHRSW Pressure Drop Calculation, Rev. 0
EC-016-0034, Spray Pond UHS Design Analysis, Rev. 1
EC-016-0503, RHRSW Pump Acceptance Criteria, Rev. 0
EC-016-0504, Minimum Acceptable RHRSW Pump Discharge Pressure, Rev. 0
EC-0160-513, RHRSW/ESW Pump Inspection Criteria for Impeller and Impeller Liner, Rev. 0
EC-016-0527, MOV Data Detail Calculations for HV112F073B, Rev. 4
EC-016-0531, Power Uprate Impact Review RHRSW System and Ultimate Heat Sink, Rev. 2
EC-016-0566, RHRSW Flow Indication for ISI Test Engineering Report, Rev. 0
EC-016-1002, Ultimate Heat Sink – Minimum Heat Transfer Design Basis Analysis, Rev. 14
EC-016-1010, MOV Data Detail Calculations for HV11215B, Rev. 7

EC-016-1027, Required Operating Torque and Weak Link Analysis, HV11215B, Rev. 0
EC-016-1028, Weak Link Analysis Report for HV112F073A/B and HV212F073A/B, Rev. 1
EC-017-0536, 1Y246-08 Connected Load Voltage, Rev. 0
EC-023-0507, Diesel Generator A-E Fuel Oil Day Tank Capacity, Rev. 4
EC-024-0503, Diesel Generator Load Calculation, Rev. 18
EC-024-0629, FSAR EDG Loading Table, Rev. 11
EC-034-0512, Cooling Loads–Reactor Building Zone I–Normal and Accident, Rev. 4
EC-034-0528, Safety-Related Room Cooler Design Basis, Rev. 0
EC-034-0541, RHR Pump Room Temperatures for Reduced Flow to RHR Room Cooler, Rev. 0
EC-034-0544, Performance Characterization of ECCS and RCIC Pump Room Coolers, Rev. 0
EC-034-0561, ESW Flow Balance Acceptance Criteria for HPCI/RHR Room Coolers, Rev. 0
EC-034-1009, ECCS Room Cooler Performance at Minimum ESW Flow Conditions, Rev. 0
EC-034-1020, Min. Thickness Requirements for RHR Room Cooler Heat Exchangers, Rev. 0
EC-037-1001, HPCI/RCIC Auto CST Transfer and Technical Specification Allowance, Rev. 3
EC-049-1001, RHRHX Performance at 8000 gpm RHR SW Flow, 9500 gpm RHR Flow, Rev. 5
EC-051-0004, Core Spray Technical Specification Test Pressure, Rev. 6
EC-052-0002, Orifice Sizing of HPCI Test Line, Rev. 0
EC-052-0501, MOV Data Detail Calculation for HV256F059, Rev. 6
EC-052-0516, Determine Size of HPCI Test Line Flow Orifice, F015510, Rev. 0
EC-052-0517, Determine the Size of HPCI Return Line Flow Orifice, FO215510, Rev. 0
EC-052-0521, HPCI Technical Specification Surveillance Test, Rev. 0
EC-052-0522, Maximum HPCI Pump Discharge Pressure, Rev. 1
EC-052-0523, HPCI Surveillance Test Acceptance Criteria for High Pressure Test, Rev. 1
EC-052-0533, MOV Data Detail Calculation for HV255F001, Rev. 13
EC-052-1038, Maximum Thrust and Seismic Analysis for HV 155F001, HV 255F001, Rev. 0
EC-052-1055, CST Water Level for HPCI Suction Transfer, Rev. 0
EC-052-1056, HPCI System Acceptance Criteria for Gas Intrusion, Rev. 0
EC-054- 0544, Power Uprate Review Emergency Service Water System, Rev. 3
EC-054-0001, Emergency Service Water – Pressure Drop Calculation, Rev. 1
EC-054-0511, Determine if Sufficient Cooling Water Can be Provided to DG Coolers, Rev. 5
EC-054-0519, Minimum Acceptable Pump Discharge Pressure, Rev. 0
EC-054-0525, 'B' and 'D' ESW Pump Suction Bell Replacement Requirements, Rev. 0
EC-054-0528, ESW Pump Maximum Flow Rate for Continuous/Short Term Operation, Rev. 1
EC-054-0537, ESW System Heat Load/Flow Rate Requirements for EPU Conditions, Rev. 5
EC-054-1016, ESW Pump Performance Test Data for Pump Interaction Concerns, Rev. 1
EC-054-1019, Resolution of ESW Pump Interface Issue, Rev. 0
EC-055-1008, CRD System Pressure Drop Calculations, Rev. 0
EC-060-0003, Drywell Unit Cooler Required Horsepower, Rev. 1
EC-EQQL-1015, Radiation Qualified Life Calculation, Rev. 22
EC-EQQL-1016, Determination of Target Rock SOV Operating Temperature, Rev. 0
EC-LOCA-1001, Evaluation of NRC IN 93-17, 1/24/94
EC-PUPC-20600, SSES EPU Task Report T0600, Offsite Power, Rev. 0
EC-PUPC-20601, Extended Power Up-rate for Onsite AC Site Power, Rev. 0
EC-PUPC-20601, SSES EPU Task Report T0601, Onsite AC Power, Rev. 0
EC-RADN-1008, Post-LOCA Personnel Access Doses Inside Reactor Building, Rev. 1
EC-SOPC-0529, Relay Setting for 0B565 MCC Undervoltage, Rev. 0
EC-SOPC-0584, Relay Setting for 125 Vdc and 250 Vdc Battery Chargers, Rev. 0

EC-SOPC-0586, Relay Setting for DC Load Center Breakers, Rev. 0
EC-SOPC-0598, Relay Setting for DG A/B/C/D Voltage Restrained Overcurrent, Rev. 0
EC-SOPC-0747, Relay Setting for DG A B/C/D Differential, Rev. 0
EC-VALV-0571, Design Basis for Priority 3 Motor Operated Valves, Rev. 18
EC-VALV-1022, Periodic Performance Assessment of GL 89-10 Gate/Globe Valves, Rev. 34
EC-VALV-1072, MOV Calculation Results for HV255F001 (SSES-2), 9/15/10
EC-VALV-1073, Actuator Sizing and Diagnostic Test Acceptance Criteria for GL 89-10 AC (Unit 1) Rising Stem MOVs, Rev. 44
EQAR-001, EQ Binder, Target Rock SOVs, EQ Assessment Report, Rev. 13
EQAR-103, EQ Binder, ABB 27N-R Undervoltage Relay, Rev. 3

Completed Surveillance, Maintenance, and Modification Testing:

1A RHRSW Pump Results (trend), Updated 8/11/2010
ERPM 1080147, Preparation of Spare 4 kV DHP-VR Breaker for Use in 2A20104, Feed from DG A/E to Bus 2A (2A201) (8/16/08)
ERPM 1146951, Preparation of Spare 4 kV DHP-VR Breaker for Use in 2A20109, Alternate Feed to Bus 2A from ESS Transformer 201 (9/14/10)
ERPM 516269, 2A20104, Overhaul/Refurbish 4 kV Westinghouse Breaker (9/23/05)
ERPM 986915, Preparation of Spare 4 kV DHP-VR Breaker for Use in 2A20101, Main Feed to Bus 2A from ESS Transformer 101 (5/20/10)
HPCI IST Results (trend), 2P204 (2/91 thru 5/10)
Motor LO Samples, ESW Pump 0P504A (2/17/10, 8/21/09, 2/20/09, 8/20/08)
Motor LO Samples, ESW Pump 0P504B (8/12/10, 2/18/10, 8/24/09, 2/11/09, 5/15/08)
Motor LO Samples, ESW Pump 0P504C (2/17/10, 8/21/09, 2/20/09, 8/20/08)
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Motor LO Samples, RHRSW 1P506B (9/7/10, 12/10/09, 6/9/09, 12/11/08, 5/14/08)
Motor LO Samples, RHRSW 2P506A (6/17/10, 11/19/09, 6/19/09, 12/22/08, 12/18/08, 6/18/08)
Motor LO Samples, RHRSW Pump 2P506B (9/9/10, 3/17/10, 12/11/09, 9/10/09, 6/11/09)
MT-024-024, DG Engine Analysis and Load Balancing (6/5/08)
MT-EO-053, Static or Dynamic Testing of MOVs Using QUIKLOOK for HV11215B (10/10/07)
MT-EO-059, Static or Dynamic Testing of MOVs Using QUIKLOOK II for HV112F073B (8/12/10)
MT-GM-015, Heat Exchanger Torque Data Sheets (7/28/09)
MT-GM-025, Heat Exchanger - Cleaning and Inspection (8/2/05, 7/27/09)
MT-RC-005, COV Relay Calibration Procedure (3/18/08)
Power Factor Test Data, ESW Pump 0P504A (1979, 1985, 1996, 1999, 2002, 2006)
Power Factor Test Data, ESW Pump 0P504B (1980, 1996, 1999, 2003, 2007)
Power Factor Test Data, ESW Pump 0P504C (1979, 1980, 1985, 1997, 2000, 2004)
Power Factor Test Data, ESW Pump 0P504D (1980, 1997, 2000, 2006)
Power Factor Test Data, RHRSW Pump 1P506A (1979, 1985, 1997, 2003, 2007)
Power Factor Test Data, RHRSW Pump 1P506B (1980, 1986, 2000, 2004)
Power Factor Test Data, RHRSW Pump 2P506A (1979, 1982, 2000)
Power Factor Test Data, RHRSW Pump 2P506B (1980, 1986, 2001)
RTPM 645720, Replace Agastat Relay HSX12605 in 1C661B3 (3/4/10)
RTSV-875254, 24 Month Calibration–DG 'E' Lube Oil Pressure Switches (8/12/08)
SE-024-E01, Diesel Generator 'E' Integrated Surveillance Test (12/30/09)
SE-024-E02, Diesel Generator 'E' Overspeed Trip Test (8/26/08)

SE-028-E01, 24 Month Diesel Generator 'E' HVAC Timer Setpoint Verification (7/14/08)
SE-124-207, Unit 1 Division II Diesel Generator LOCA LOOP Test (4/8/10)
SE-124-E01, Unit 1 DG E LOCA Start/ECCS Override Test (3/26/10)
SE-149-010, Functional Test of RHR Loop B, RHR Common, RHRSW, CIG at 1C201B (8/1/08)
SE-155-201, 24 Month Div II CRD Pump 1P132B DC Control Auto Transfer (5/12/10, 4/19/08)
SE-159-201, Two Year Manual Initiation of Drywell Cooling Isolation (4/5/10)
SM-202-001, Monthly 2D610 Battery Checks (8/18/10)
SM-202-001, Quarterly 2D610 Battery Checks (8/26/10)
SM-202-A03, 24-Month 2D610 Battery Service Test and Charger Capability Test (4/10/09)
SM-202-A04, 48-Month 2D610 Battery Modified Performance Test (3/5/07)
SO-024-014, Monthly Diesel Generator 'E' Operability Test (9/10/10)
SO-135-005, Fuel Pool Cooling/RHR Fuel Pool Assist Manual Valve Exercising (2/23/06, 3/4/08, 2/24/10)
TP-224-001, Initial Installation of Unit 2 DG Vacuum Circuit Breaker (9/22/05)
WO 1154682, RHR/ESW Manhole Pumpdown and Inspection Log (7/7/10, 8/4/10, 9/1/10)

Corrective Action Documents:

0851719	1182421	1293269	1308374*	1310481*
1011495	1186868	1298305	1308383*	1310638*
1012546	1187023	1301361	1308498*	1310719*
1016206	1190939	1301395	1308499*	1310741*
1020934	1196389	1302108	1308682*	1310786*
1033449	1199333	1302816	1308730*	1310853*
1036160	1217484	1302829	1308879*	1310853*
1051751	1223689	1302829	1308882*	1310869*
1066712	1223997	1303731*	1308994*	1311408*
1066713	1233236	1303789	1308995*	322052
1072119	1236506	1304133	1309002*	366932
1074940	1238631	1304220*	1309021*	847827
1077901	1256045	1304322*	1309341*	849709
1092718	1256383	1304510*	1309392*	863906
1095418	1257291	1304558*	1309903*	879269
1138054	1260626	1304560*	1309904*	887571
1138064	1263112	1304608*	1309961*	891713
1138347	1263905	1305232*	1309993*	896846
1143474	1264370	1305655	1310001*	901919
1165553	1265163	1306219*	1310013*	908759
1165792	1272858	1306223*	1310042*	913696
1172734	1277534	1306232*	1310196*	916243
1172997	1277584	1306404	1310291*	955151
1180398	1277599	1307878	1310346*	955743
1180984	1279039	1308277*	1310358*	961019
1181200	1286246	1308298*	1310386*	
1182416	1293188	1308322*	1310441*	

* Document written as a result of inspection effort.

Attachment

Drawings:

3705, 20' Wafer Sphere Valve, 150# ANSI Flanged Model-A, Nuclear Class-3, Sh. 2, Rev. L
5-760-B, 300 lb., Motor Operated, Gate Valve, Rev. B
5-784-C, 150 lb., Motor Operated, Gate Valve, Rev. C
69-XC-103, HPCI Turbine Stop Valve, Rev. 5
8856-M30-187, EDG System Schematic Regulator Chassis, Rev. 9
945142, 2" Yarway Welbond Valve with Limitorque Electric Motor Actuator, Rev. D
D222106, MOV Program Design Control Flowpath, Sh. 1, Rev. 5
E-05, 4.16 kV Engineered Safeguards Power System, Sh. 2, Rev. 30
E-103, 4.16 kV Bus 2A Auxiliary Relay Control, D/G 'E' Aligned for D/G 'A', Sh. 14A, Rev. 9
E-103, 4.16 kV Bus 2A Feeder Breaker from ESS Transformer 101, Sh. 13, Rev. 26
E-103, 4.16 kV Bus 2A Incoming Feeder Breaker from ESS Transformer 201, Sh. 15, Rev. 23
E-105, 4.16 kV Bus 2A DG Circuit Breaker Control, Sh. 9A, Rev. 6
E-105, Unit-1 4 kV Bus 1A EDG Circuit Breaker Control Schematic, Sh. 1, Rev. 25
E-105, Unit-1 4 kV Bus 1A EDG Circuit Breaker Control Schematic, Sh. 1A, Rev. 7
E105955, High Pressure Coolant Injection, Sh. 1, Rev. 41
E105956, HPCI Lubricating and Control Oil, Sh. 2, Rev. 9
E105956, HPCI Turbine Pump, Sh. 1, Rev. 26
E106215, Service Water System, Rev. 43
E106216, Emergency Service Water System 'A' Loop, Sh. 2, Rev. 51
E106216, Emergency Service Water System 'B' Loop, Sh. 3, Rev. 22
E106216, Emergency Service Water System, Sh. 1, Rev. 48
E106216, Emergency Service Water System, Sh. 4, Rev. 2
E-11, Unit-2 125 & 250 Vdc System Single Line and Relay Diagram, Sh. 2, Rev. 27
E-112-4, RHRSW Pump Motors, Rev. 7
E162641, RHR Service Water System, Sh. 1, Rev. 29
E-172, CIG Isolation Solenoid Valve SV-12605, Sh. 5A, Rev. 3
E221229, MOV Data Detail for HV255F001, Sh. 1, Rev. 11
E221242, MOV Data Detail for HV256F059, Sh. 1, Rev. 9
E-23, Schematic Diagram, Switch Contact Development, Transfer Panel, Sh. 11, Rev. 3
E-26, Unit-2 125 Vdc ESS Distribution Panels Single Line and Relay Diagram, Sh. 4, Rev. 25
E-26, Unit-2 125 Vdc non-ESS Distribution Panels Single Line and Relay Diagram, Sh. 5, Rev. 25
E-31, Electrical System 4.16 kV Bus Incoming Feeder Breaker, Sh. 5, Rev. 12
E-31, Electrical System 4.16 kV DG Circuit Breaker, Sh. 8, Rev. 7
E-31, Electrical System 4.16 kV ESS LC Primary Breakers, Sh. 7, Rev. 3
E-40, Electrical Local Device List, Sh. 5X, Rev. 6
E-413, Manholes and Duct Banks, Sh. 1, Rev. 36
E-413, Plot Plan, Manholes and Duct Banks, Sh. 2, Rev. 10
E-5, 'E' EDG 4 kV Single Line & Relay Diagram, Sh. 5, Rev. 14
E-8, Unit-1 480 Vac Load Center Single Line and Relay Diagram, Sh. 4, Rev. 17
E-8, Unit-2 480 Vac Load Center Single Line and Relay Diagram, Sh. 8, Rev. 18
E-9, 480 Vac MCC 0B516 Single Line Meter and Relay Diagram, Sh. 39, Rev. 18
E-9, 480 Vac MCC 0B536 Single Line Meter and Relay Diagram, Sh. 43, Rev. 18
E-9, 480 Vac MCC 0B565 Single Line Meter and Relay Diagram, Sh. 77, Rev. 19
EE-70, Embedded Conduit and Grounding, Engineered Safeguards SW Pumphouse, Rev. 8
FF 103210-3101, EC-1 Series Trip Device Time-Current Curves, Rev. 2

FF 61774, KCR-21 Discharge Characteristics, Sh. 5, Rev. 0
FF 62098, VR Series Schematic Diagram, Sh. 3, Rev. 0
FF 62098, VR Series Breaker Wiring Diagram, Sh. 6, Rev. 0
FF 65100, Brown Boveri Metal Clad Switchgear Schematic Diagram, Sh. 11, Rev. 3
FF 65100, HK Wiring Diagram, Sh. 53, Rev. 2
FF103120, RHRSW Pump Motors 1P506A, B and 2P506A, B, Rev. 7
FF104700, 2" SW Solenoid Operated Globe Valve Assembly 'Y' Pattern, Fail Closed, Low Temperature, Rev. 13
FF110100, 10" - 900 Weld-Ends Pressure Seal, Flex-Wedge, Carbon Steel Gate Valve with SMB-2-60 (DC) Limitorque Operator, Rev. 9
FF118250, Control Rod Drive Hydraulic System, Rev. 7
FF61604, DG 'E' Control Schematic Explanations, Sh. 43, Rev. 6
FF61604, DG 'E' Control Schematic Miscellaneous, Sh. 39A, Rev. 2
FF61604, DG 'E' Control Schematic Starting Sequence Control, Sh. 28, Rev. 10
FF61604, DG 'E' Control Schematic Starting Sequence Control, Sh. 29, Rev. 7
FF61604, DG 'E' Control Schematic Starting Sequence Control, Sh. 32, Rev. 6
G5-553-243, Control Schematic, Starting Sequence Control, Rev. 6
GBB-119-1, Reactor Building RHR Service Water–Unit 1, Rev. 3F5
HRC10-3, Emergency Service Water Pumphouse, Sh. 1, Rev. 5
HRC-113-1, Reactor Building RHR Service Water–Unit 1, Rev. 4F6
J-653, CST Level Settings Diagram, Rev. 6
M-112, RHR Service Water System P&ID, Sh. 1, Rev. 50
M-1137, Motor Operated Valve Program Design Control Flowpath, Sh. 1, Rev. 5
M126, Containment Instrument Gas, Sh. 1, Rev. 32
M-134, 'E' DG Auxiliaries (Fuel Oil, Lube Oil and Air Intake & Exhaust Systems), Sh. 7, Rev. 15
M-134, 'E' DG Auxiliaries (Starting Air and Jacket Water Systems), Sh. 5, Rev. 14
M-134, 'E' DG Auxiliaries (Starting Air System), Sh. 6, Rev. 6
M-151, Residual Heat Removal, Sh. 3, Rev. 24
M-151, Residual Heat Removal, Sh. 4, Rev. 18
M30-124, DG Control–Terminal and Component Location 0C521A, Sh. 15, Rev. 11
M30-124, Starting Sequence Control Panel 0C521A, Sh. 1, Rev. 22
M30-124, Starting Sequence Control Panel 0C521A, Sh. 2, Rev. 18
SE-016-311, ISI Pressure Test Diagram, Functional Test ESW/RHRSW Loop B, Sh. 1, Rev. 4

Design Basis Documents:

DBD001, Class 1E DC Electrical, Rev. 4
DBD004, High Pressure Coolant Injection System, Rev. 5
DBD006, Class 1E AC Electrical System, Rev. 3
DBD009, ESW, RHRSW and UHS, Rev. 2
DBD013, Diesel Generators and Auxiliaries, Rev. 4
DBD017, Reactor Building Closed Cooling Water System, Rev. 1
DBD040, Containment Instrument Gas System, Rev. 2
DBD041, Reactor Core Isolation Cooling System, Rev. 2
DBDCC-01, Primary Component Cooling Water System, Rev. 4
MDS-03, Design Standard for Determining/Setting Valve Motor Actuator Limit Switches, Rev. 4
MDS-05, Design Standard for MOV Weak Link Evaluation Criteria, Rev. 2
MDS-08, Design Standard for Periodic Performance Assessment of SSES MOVs, Rev. 11

Miscellaneous:

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93-3070/1, Safety Evaluation, HPCI Suction Auto Transfer to Suppression Pool Logic Elimination, 1/10/96
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EC-RISK-1128, Human Reliability Notebook, Rev. 3
EC-RISK-1145, PRA Summary Notebook, Rev. 0
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EM-201, Breaker Test Set M&TE Calibration Data Sheet, 12/14/09
ETAP Certification Letter for ETAP 7.1.0N, Build 7.1.0.30909, 12/8/09
FF 105800, Generator Data Sheet, Serial No. 17402243/46, 2/4/75
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IEEE 485, Sizing Lead Storage Batteries, 1978 Edition
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Maintenance Rule Status Report, Unit-1, Main Steam System, 2nd Quarter, 2010
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NIMS Component Data Sheet for Relay HSX12605, Install Date 2/20/03
NIMS PM Last Performed Dates for 0B516 MCC Circuit Breakers, 9/10
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PA-B-NA-020, CRD System Notebook, Rev. 0
PA-B-NA-027, RHRSW System Notebook, Rev. 1
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RHRSW Pump Results (trend), Updated 8/11/10
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System Health Report, 023-Diesel Fuel Oil, 1st Quarter 2010
System Health Report, 024-Diesel Generators, 1st Quarter 2010
TM-OP-024A-ST, 'E' Emergency Diesel Generator, Rev. 6

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DCN 65-0272B, Provide Safety Grade Manual Controls for ADSVs, 9/19/88
DCP 486199, 4 kV Breaker Replacement, 5/5/03
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EO-000-102, RPV Control, Rev. 8
EO-000-102-1, RPV Control, Rev. 7
EO-000-103-1, PC Control, Rev. 13
EO-000-104-1, Secondary Containment Control, Rev. 7
EO-000-105-1, Radioactivity Release Control, Rev. 4
EO-000-112, Rapid Depressurization, Rev. 5
EO-000-112-1, Rapid Depressurization, Rev. 6
EO-000-113, Level/Power Control, Rev. 8
EO-000-113-1, Level/Power Control, Rev. 10
EO-000-114-1, RPV Flooding, Rev. 8
EO-200-030, Unit 2 Response to Station Blackout, Rev. 20
EP-PS-102, Technical Support Coordinator, Rev. 29
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GO-100-014, Hot Weather Operation, Rev. 4
JDS-02, Instrument and Control Setpoint Calculation Methodology, Rev. 1
MDS-01, Design Standard for Sizing, Selection and Determination of Diagnostic Test Acceptance Criteria for Limitorque Actuator on Rising Stem Valves, Rev. 14
MDS-08, Design Standard for Periodic Performance Assessment of MOVs, Rev.11
MT-EO-059, Static or Dynamic Testing of MOVs Using QUIKLOOK II, Rev. 1
MT-GE-014, DC Switchgear Inspection and Breaker Maintenance, Revs. 14, 15, and 16
MT-GE-048, DHP-VR 4.16 kV Circuit Breaker/Switchgear Inspection and Maintenance, Rev. 14
MT-GM-003, Valve Disassembly, Reassembly, and Rework, Rev. 18
MT-GM-015, Torquing Guidelines, Rev. 22
MT-GM-025, Heat Exchanger - Cleaning and Inspection, Rev. 17
MT-GM-050, Limitorque Type SMB 000–4 and Type SB-3 Operator Maintenance, Rev. 18
MT-IT-001, AC Insulation Dielectric Loss and Power Factor Checking, Rev. 14
NDAP-QA-0017, Motor Operated Valve Program, Rev. 12
NDAP-QA-0524, Equipment Reliability and Station Health Process, Rev. 8
OI-AD-029, Emergency Load Control, Rev. 13
ON-179-001, Increasing Offgas/Main Steamline Radiation Levels, Rev. 8
OP-024-001, Diesel Generators, Rev. 56
OP-024-004, Transfer and Test Mode Operations of 'E' Diesel Generator, Rev. 27
OP-054-001, Emergency Service Water System, Rev. 29
OP-102-002, Operation of 125 Vdc Common Load Manual Transfer Switches, Rev. 13
OP-111-001, Service Water System, Rev. 30
OP-114-001, Reactor Building Closed Cooling Water System, Rev. 20
OP-116-001, RHR Service Water, Rev. 29
OP-125-001, Containment Instrument Gas System, Rev. 31
OP-155-001, Control Rod Drive Hydraulic System, Rev. 48
OP-183-001, Automatic Depressurization System and Safety Relief Valves, Rev. 16
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SE-024-A01, Diesel Generator 'A' Integrated Surveillance Test Procedure, Rev. 7

SE-024-E01, Diesel Generator 'E' Integrated Surveillance Test, Rev. 3
SE-024-E02, DG 'E' Overspeed Test, Rev. 6
SE-028-E01, 24 Month Diesel Generator 'E' HVAC Timer Setpoint Verification, Rev. 5
SE-054-001D, Logic System Functional Test of the ESW Pump 'D' Start/Reset Logic, Rev. 3
SE-124-207, Division II Diesel Generator LOCA LOOP, Rev. 19
SE-124-E01, DG 'E' Substitution Integrated Surveillance Test, Rev. 2
SM-024-002, 24 Month Emergency Diesel Engine Inspection, Rev. 15
SM-024-E01, Diesel Generator 'E' 24 Month Inspection, Rev. 8
SM-024-E02, 60 Month 4KV DG 'E' Differential Relay Calibration, Rev. 8
SO- 054-B08, Comprehensive ESW Flow Verification Loop B, Rev.1
SO-024-014, Monthly Diesel Generator 'E' Operability Test, Rev. 32
SO-054-B03, Quarterly ESW Flow Verification, Loop B, Rev. 9
SO-116-001, Monthly RHR Service Water System Alignment Check, Rev. 11
SO-116-A04, RHRSW System Comprehensive Flow Verification Division I, Rev. 3
SO-116-B02, Quarterly RHRSW Valve Exercising Division II, Rev. 4
SO-116-B03, Quarterly RHRSW System Flow Verification Division II, Rev. 4
SO-151-A05, Core Spray Comprehensive Flow Verification Division I, Rev. 4
SO-252-002, Quarterly HPCI Flow Verification, Rev. 45
SO-252-006, 24 Month HPCI Flow Verification, Rev. 18
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TP-054-095, ESW Low Flow Pump Test, Rev. 1
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22A1362AW, HPCI System Design Specification Data Sheet, Rev. 9
22A5261AK, Instrument Setpoints and Technical Specification Limits, Rev. 0
3379001-11, Service Bulletin - Fuels for Cummins Engines, 3/20/07
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749-1,2,3,4 – Morrison-Knudsen Power Systems Division, Emergency Standby KSV Diesel
82-4101-A02, Thermal Barrier Heat Exchanger Specifications, Rev. 2
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H-1104, Heat Exchanger/Condenser Inspection and Condition Assessment, Rev. 6
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G0110-05	686179	1039202	1064097	1180547
102178	793915	1040354	1075647	1181472
190925	834911	1044614	1076683	1185421
310545	869733	1045037	1093913	1187824
361258	869735	1049544	1101490	1265387
382102	869743	1050794	1119879	1269860
453241	871168	1050797	1146955	1279373
488357	882760	1050816	1147876	1300871
490731	889807	1062198	1148267	
583461	959402	1062837	1149535	
642854	1037358	1063635	1180547	

LIST OF ACRONYMS

AC	Alternating Current
ADS	Automatic Depressurization System
ATWS	Anticipated Transient Without Scram
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CIG	Containment Instrument Gas
CR	Condition Report
CRD	Control Rod Drive
DC	Direct Current
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EPU	Extended Power Uprate
ESW	Emergency Service Water
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
kV	kilo-Volts
LOCA	Loss-of-Coolant Accident
MCC	Motor Control Center
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
PM	Preventive Maintenance
PPL	PPL Susquehanna, LLC
PRA	Probabilistic Risk Assessment
RAW	Risk Achievement Worth
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RRW	Risk Reduction Worth
SBO	Station Blackout
SDP	Significance Determination Process
SPAR	Standardized Plant Analysis Risk
SSES	Susquehanna Steam Electric Station
SW	Service Water
UFSAR	Updated Final Safety Analysis Report
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current
WO	Work Order