UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

July 16, 2014

Mr. John Dent
Site Vice President
Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360-5508

SUBJECT: PILGRIM NUCLEAR POWER STATION - NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000293/2014007

Dear Mr. Dent:

On June 19, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed the onsite portion of an inspection at the Pilgrim Nuclear Power Station (PNPS). The enclosed inspection report documents the inspection results, which were discussed on June 19, 2014, with Mr. David Noyes, Acting Site Vice President, and other 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 involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

Based on the results of this inspection, no findings were identified.

In accordance with Title 10 of the *Code of Federal Regulations* (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,

/RA/

Christopher G. Cahill, Acting Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-293
License No. DPR-35

Enclosure: Inspection Report No. 05000293/2014007
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No.:	50-293
License No.:	DPR-35
Report No.:	05000293/2014007
Licensee:	Entergy Nuclear Operations, Inc. (Entergy)
Facility:	Pilgrim Nuclear Power Station
Location:	600 Rocky Hill Road Plymouth, MA 02360
Dates:	May 19 to June 19, 2014
Inspectors:	S. Pindale, Senior Reactor Inspector, Division of Reactor Safety (DRS) Team Leader J. Ayala, Reactor Inspector, DRS J. Brand, Reactor Inspector, DRS M. Orr, Reactor Inspector, DRS J. Leivo, NRC Electrical Contractor J. Zudans, NRC Mechanical Contractor
Approved by:	Christopher G. Cahill, Acting Chief Engineering Branch 2 Division of Reactor Safety

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SUMMARY

IR 05000293/2014007; 5/19/2014 – 6/19/2014; Entergy Nuclear Operations, Inc., (Entergy), Pilgrim Nuclear Power 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. 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.

No findings were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: 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 for review using information contained in the Pilgrim Nuclear Power Station Probabilistic Risk Assessment and the U.S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk model. Additionally, the Pilgrim Nuclear Power Station Significance Determination Process analysis was referenced in the selection of potential components for review. In general, the selection process focused on components that had a Risk Achievement Worth factor greater than 1.3 or a Risk Reduction Worth factor greater than 1.005. The team also selected components based on previously identified industry operating experience issues and the component contribution to the large early release frequency (LERF) was also considered. 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, electrical buses, transformers, and valves.

The team initially compiled a list of components based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection reports (05000293/2008007 and 05000293/2011007) and those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 18 components and 4 operating experience samples. Two components were selected because they were containment-related structures, systems, and components and were considered for LERF implications. 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 (OE). Finally, consideration was given to the uniqueness and complexity of the design and the available defense-in-depth margins.

The inspection performed by the team was conducted in accordance with NRC Inspection Procedure 71111.21. This inspection effort included walkdowns of selected components, interviews with operators, system and design engineers, and reviews of associated design documents and calculations to assess the adequacy of the components to meet the design and licensing basis. A summary of the reviews performed for each component and OE sample 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 (18 samples)

.2.1.1 Safety Relief Valve, RV-203A

a. Inspection Scope

The team inspected safety relief valve (SRV) RV-203A as a representative sample of the four SRVs to determine if it was capable of meeting its design basis function to depressurize the reactor vessel during postulated accidents. The SRVs are also part of the automatic depressurization system (ADS), which is designed to reduce the nuclear system pressure so that the low pressure core cooling systems can reflood the core following certain postulated accidents. The team reviewed applicable portions of the updated final safety analysis report (UFSAR), technical specifications (TS), TS Bases, and system design basis documents (DBD) to identify the design basis requirements for the pilot-operated relief valve. The team reviewed the vendor manual to identify design specifications for the SRV and associated solenoid valve. The team also reviewed surveillance procedures, emergency operating procedures, and SRV test results to determine whether the valve's relief capacity was consistent with the design assumptions to depressurize the reactor vessel during design basis accident conditions, and whether test result acceptance criteria enveloped design basis limits. The team also reviewed the vendor manual to determine the recommended inspection and maintenance activities and compared those recommendations to Entergy's rebuild and repair procedures and scheduling database. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.2 Drywell Purge Valves, AO-5044A and AO-5044B

a. Inspection Scope

The drywell purge valves, AO-5044A and AO-5044B, were reviewed to verify that they were capable of performing their design basis function to close in response to a containment isolation signal. These valves can also perform a non-credited action of depressurizing the drywell during a postulated accident in the event the credited, torus vent system fails to function. The team reviewed applicable portions of the UFSAR, the primary containment DBD and calculations to identify the design basis functions for the drywell purge valves. The team reviewed the corrective and preventive maintenance history, design changes, drawings, and related testing of the valves to ensure that they were capable of performing their specified functions. The team also verified that Entergy properly translated design requirements and operational limits into procedures.

The team interviewed the system engineer and valve specialist; and performed visual inspections of the purge valves to assess Entergy's configuration control, the material condition, the operating environment, and potential external hazards. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.3 Reactor Building Closed Cooling Water Pump, P-202B

a. Inspection Scope

The team inspected reactor building closed cooling water (RBCCW) pump P-202B to evaluate whether it was capable of performing its design basis function to supply cooling water to standby cooling systems, the equipment area cooling system, and the residual heat removal heat exchangers during postulated accident and transient conditions. The team reviewed applicable portions of the UFSAR, TSs, system DBDs, and drawings to identify the design basis requirements for the pump. The team evaluated whether the pump capacity was sufficient to provide adequate flow to the components supplied by the system during normal operations and postulated events. The team also reviewed design calculations to assess available net positive suction head and worst case pump run-out conditions. The team reviewed RBCCW pump in-service test (IST) results to evaluate whether the testing was adequate to detect degrading pump performance. Specifically, the team reviewed pump data trends for vibration, pump differential pressure, and flow rate test results to verify acceptance criteria were met and acceptance limits were adequate.

The team reviewed system modifications and changes that potentially impacted RBCCW flow and/or system operating characteristics to ensure that Entergy properly evaluated the changes. Additionally, the team reviewed supporting electrical calculations, including load flow, voltage drop, motor protection and brake horsepower requirements for the RBCCW pump motor and feeder cable to determine that Entergy had appropriately translated the design bases and assumptions into calculations; and that the motor could perform its safety functions during design basis conditions. The team interviewed the system engineer and performed several walkdowns of the pump to evaluate its material condition and assess the pump's operating environment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.4 Torus Cooling/Spray Isolation Valves, MO-1001-34A, MO-1001-36A, and MO-1001-37A

a. Inspection Scope

The team reviewed the torus cooling and spray isolation valves MO-1001-34A, MO-1001-36A, and MO-1001-37A, to evaluate whether they were capable of meeting their design basis functions. The 34A valve is located in a common upstream pipe, and the 36A (torus cooling) and the 37A (torus spray) valves are located in separate lines that split from piping downstream of the 34A valve. All three valves will shut and be interlocked shut if a low pressure cooling injection initiation signal is received. The team reviewed the UFSAR, TSs, TS Bases, system DBD, drawings, procedures, and the IST basis document to identify the performance requirements for the valve. The team reviewed periodic motor-operated valve (MOV) diagnostic test results and stroke-timing test data to verify acceptance criteria were met. The team evaluated whether the MOV safety functions, performance capability, and design margins were adequately monitored and maintained in accordance with Entergy's MOV program requirements. Additionally, the team reviewed vendor manuals and calibration records for the instruments that provide actuation signals to open or close the MOVs to verify the instruments were properly maintained to support valve actuation in accordance with the plant design.

The team verified that the MOV analyses used the maximum differential pressure expected across the valve during worst case operating conditions. The team reviewed supporting electrical calculations that established the degraded and maximum voltages at the MOV terminals to ensure the proper voltages were used in the MOV torque calculations. The design, operation, and maintenance of the valve were discussed with engineers to evaluate the valves' performance history, maintenance, and overall health. The team also conducted a walkdown of the valve and associated equipment to assess the material condition of the equipment and to determine if the installed configuration was consistent with the plant drawings, procedures, and the design bases. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.5 Control Rod Drive Pumps, P-209A/B

a. Inspection Scope

The team inspected control rod drive (CRD) pumps P-209A/B to evaluate whether they were capable of performing their design basis function to supply clean, high pressure condensate water to the hydraulic control units at the pressure and flow required for the operation of the control rod drive mechanisms. The system also supplies water to the recirculation pump seals and the reference leg backfill system. The team reviewed applicable portions of the UFSAR, TSs, system DBDs, and drawings to identify the design basis requirements for the pumps. The team evaluated whether the pump capacity was sufficient to provide adequate flow to the associated CRD components and the reactor. The team reviewed design calculations to assess available pump net positive suction head and worst case pump run-out conditions. The team reviewed CRD pump IST results to evaluate whether the testing was adequate to detect degrading pump performance. Specifically, the team reviewed pump data trends for vibration, pump differential pressure, and flow rate test results to verify acceptance criteria were met and acceptance limits were adequate.

The team reviewed system modifications and changes that potentially impacted CRD flow and/or system operating characteristics to ensure that Entergy properly evaluated the changes. Additionally, the team reviewed supporting electrical calculations, including load flow, voltage drop, motor protection and brake horsepower requirements for the CRD pump motor and feeder cable to determine that Entergy had appropriately translated the design bases and assumptions into calculations; and that the motor could perform its safety functions during design basis conditions. The team interviewed the system engineer and performed several walkdowns of the pump to evaluate its material condition and assess the pump's operating environment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.6 Salt Service Water Heat Exchanger, E-209A

a. Inspection Scope

The team inspected salt service water (SSW) heat exchanger E-209A to evaluate its ability to meet its design basis requirement provide cooling water to the reactor building and turbine building closed cooling water system heat exchangers during normal, shutdown, and accident conditions. The team reviewed applicable portions of the UFSAR, TSs, system DBD, and drawings to identify the design basis requirements for the SSW heat exchanger. The team verified that Entergy properly translated design input into system procedures and tests. The team reviewed completed thermal performance tests, heat exchanger internal inspection results, and quarterly IST results to verify heat exchanger operability and to ensure that Entergy appropriately addressed potential adverse trends or conditions. The team reviewed the maintenance history, design changes, CRs, calculations, design specifications, drawings and surveillance tests to ensure that the heat exchanger condition and heat removal capability were consistent with accident analyses assumptions. The team reviewed associated operating, abnormal, and emergency procedures to ensure consistency with the licensing and design bases. The team also performed walkdowns of accessible areas to assess the heat exchanger material condition and Entergy's configuration control.

Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

2.1.7 Emergency Diesel Generator 'A' (Mechanical)

a. Inspection Scope

The team inspected the 'A' emergency diesel generator (EDG) mechanical systems to evaluate if they were capable of operating during design basis events. Specifically, the team evaluated the capabilities of the fuel oil, fuel oil transfer, lube oil, starting air, intake, exhaust, and jacket water cooling systems to ensure the proper operation of the EDG to provide electric power to the 4.16 kV system during operational transients and design basis events. The team reviewed the UFSAR, TSs, operating procedures and the system DBD to identify the design basis requirements for these systems. The team reviewed EDG test results and operating procedures to ensure the mechanical support systems were operating as designed, and verified appropriate maintenance was being performed on the systems. The team also reviewed system operating procedure to determine if the mechanical systems were being operated within their vendor design limits. The team reviewed fuel oil consumption calculations to verify TS requirements were adequate to meet design basis loading conditions. The team reviewed lube oil sample results to verify proper lubrication of system components and interviewed engineering staff to ensure timely analysis for wear was being performed. In addition, the team interviewed system engineers to determine past performance and operation of the EDGs. The team performed field walkdowns of both EDGs to assess the material condition and system alignments including local and remote EDG control switch positions. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.8 Residual Heat Removal Pump and Motor, P-203A (2 samples)

a. Inspection Scope

The team inspected the P-203A residual heat removal (RHR) pump and motor set to evaluate whether it was capable of performing its design basis function to provide system flow to support removing primary system decay heat from the reactor, reflooding the reactor core following a loss of coolant accident, cooling the torus water after an accident, reducing drywell or torus pressure after an accident, and supplementing the fuel pool cooling system if required. The team reviewed applicable portions of the UFSAR, TSs, system DBDs and drawings to identify the design basis requirements for the pump and motor. The team evaluated whether the pump capacity was sufficient to provide adequate flow to the safety-related components supplied by the system during postulated events. The team also reviewed design calculations to assess available net positive suction head and worst case pump run-out conditions. The team reviewed RHR pump IST results to evaluate whether the testing was adequate to detect degrading pump performance. Specifically, the team reviewed pump data trends for vibration, pump differential pressure, and flow rate test results to verify acceptance criteria were met and acceptance limits were adequate.

The team inspected the P-203A RHR pump motor to determine whether it could fulfill its design basis function of providing adequate horsepower for the RHR pump. The team reviewed the RHR pump performance curve and design basis flow requirement to evaluate the required capacity for the brake horsepower required by the pump during design basis conditions. The team reviewed the 4.16 kV system load flow calculation and motor nameplate data to confirm that adequate voltage would be available at the motor terminals for design basis conditions. The team also reviewed the motor overcurrent relay setting calculation, relay settings, and recent overcurrent relay calibration tests to evaluate whether the protective relays would provide for reliable motor operation at design basis minimum voltage conditions.

The team reviewed system modifications and changes that potentially impacted RHR flow and/or system operating characteristics to ensure that Entergy properly evaluated the changes. This included a review of the evaluations and corrective actions performed by Entergy to address failure of the motor in January 2012, and a review of the modification that replaced the motor. The team reviewed Entergy's failure analysis for the failed motor as well as subsequent motor test results for the remaining RHR pump motors (P-203B, P-203C, and P-203D), to assess extent of condition. The team interviewed cognizant engineers and performed walkdowns of the pump and motor to evaluate their material condition and assess the components' operating environment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.9 Core Spray Pump, P-215A

a. Inspection Scope

The team inspected core spray pump P-215A to evaluate whether it was capable of performing its design basis function to provide adequate cooling of the reactor core under abnormal transient and postulated accident conditions. The team reviewed applicable portions of the UFSAR, TSs, system DBDs, and drawings to identify the design basis requirements for the pump. The team evaluated whether the pump capacity was sufficient to provide adequate flow to the safety-related components supplied by the system during postulated events. The team also reviewed design calculations to assess available net positive suction head and worst case pump run-out conditions. The team reviewed core spray pump IST results to evaluate whether the testing was adequate to detect degrading pump performance. Specifically, the team reviewed pump data trends for vibration, pump differential pressure, and flow rate test results to verify acceptance criteria were met and acceptance limits were adequate. The team also reviewed an alternate system testing alignment whereby the pump takes suction from the condensate storage tank.

The team reviewed system modifications and changes that potentially impacted core spray flow and/or system operating characteristics to ensure that Entergy properly evaluated the changes. Additionally, the team reviewed calculations associated with voltage drop, motor protection and brake horsepower requirements for the core spray pump motor power supply and feeder cable to verify that Entergy appropriately translated the design bases and assumptions into the calculations. The team interviewed the system engineer and performed several walkdowns of the pump to evaluate its material condition and assess the pump's operating environment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.10 Core Spray System Full Flow Test Isolation Valve, MO-1400-4A

a. Inspection Scope

The team inspected core spray system full flow test isolation valve, MO-10400-4A, to determine if the valve was capable of performing its design basis function. The valve provides for core spray system full flow testing (flow path to the torus) and is designed to automatically close (and interlocked to prevent opening) when a core spray system initiation signal is received. The team reviewed the UFSAR, TSs, TS Bases, the system DBD, drawings, procedures, and the IST basis document to identify the performance requirements for the valve. The team reviewed periodic MOV diagnostic test results and stroke timing test data to verify acceptance criteria were met. The team evaluated whether the MOV safety functions, performance capability, torque switch configuration, and design margins were adequately monitored and maintained in accordance with Entergy's MOV program requirements. The team also reviewed MOV weak link calculations to ensure the ability of the MOV to remain structurally functional while stroking under design basis operating conditions. The team verified that the MOV analysis used the maximum differential pressure expected across the valve during worst case operating conditions. The team also reviewed the supporting electrical calculations that established the degraded and maximum voltages at the MOV terminals to ensure the proper voltages were used in the MOV torque calculations.

The design, operation, and maintenance of the valve were discussed with the system engineer to evaluate the valve's performance history, maintenance, and overall health. The team also conducted a walkdown of the valve and associated equipment to assess the material condition of the equipment and to evaluate whether the installed configuration was consistent with the plant drawings, procedures, and the design bases. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

.2.1.11 Core Spray Injection Valve, MO-1400-25A

a. Inspection Scope

The team inspected core spray system inboard injection valve, MO-1040-25A, to determine if the valve was capable of performing its design basis function. The valve receives an automatic open signal upon core spray system initiation; and can be operated from either the control room or RHR alternate shutdown panel C-152.
The team reviewed the UFSAR, TSs, TS Bases, the system DBD, drawings, procedures, and the IST basis document to identify the performance requirements for the valve. The team reviewed periodic MOV diagnostic test results and stroketiming test data to verify acceptance criteria were met. The team evaluated whether the MOV safety functions, performance capability, torque switch configuration, and design margins were adequately monitored and maintained in accordance with Entergy's MOV program requirements. The team also reviewed MOV weak link calculations to ensure the ability of the MOV to remain structurally functional while stroking under design basis operating conditions. The team verified that the MOV analyses used the maximum differential pressure expected across the valve during worst case operating conditions. The team also reviewed the supporting electrical calculations that established the degraded and maximum voltages at the MOV terminals to ensure the proper voltages were used in the MOV torque calculations

The design, operation, and maintenance of the valve were discussed with the system engineer to evaluate the valve's performance history, maintenance, and overall health. The team also conducted a walkdown of the valve and associated equipment to assess the material condition of the equipment and to evaluate whether the installed configuration was consistent with the plant drawings, procedures, and the design bases. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.12 Automatic Depressurization System Logic

a. Inspection Scope

The team inspected the ADS logic to evaluate whether it could perform its design basis function to automatically initiate the ADS to reduce nuclear system pressure so that the core spray system and low pressure coolant injection mode of RHR can inject water into the reactor. The ADS consists of four safety relief valves and associated piping.

The team reviewed the UFSAR, TSs, TS Bases, the system DBD, drawings, and procedures identify the performance requirements for the ADS logic. The team reviewed the surveillance testing of the ADS actuation circuitry, including associated interlocks, to verify its performance under design basis conditions. The team reviewed the calculations and discussed the design, operation, and maintenance of the system with station engineers. The team also conducted a walkdown of related and inspectable components to assess the material condition of the equipment and to evaluate whether the installed configuration was consistent with the plant drawings, procedures, and the design bases. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.13 Station Battery D2 and Battery Charger D12 (2 samples)

a. Inspection Scope

The team inspected the D2 vital station battery and associated charger D12 to evaluate whether they could perform design basis functions to provide direct current (DC) power to connected loads during normal, transient, and postulated accident conditions. The team reviewed the D2 station battery calculations to verify that the sizing of the battery would satisfy the requirements of the safety-related and risk significant DC loads, and that the minimum possible voltage was taken into account. In particular, the review focused on verifying that the battery was adequately sized to supply the design duty cycle of the 125 Volts DC (Vdc) system during postulated transient and accident scenarios. The team reviewed the postulated scenarios, battery sizing calculations, voltage drop calculations, drawings and procedures to ensure that adequate voltage would remain available for the individual loads required to operate during the scenario durations. The DC protective coordination study was reviewed to verify that adequate protection existed for postulated faults in the DC system. The team also reviewed battery test results to ensure that the testing was in accordance with design calculations, the TSs, thermography results, and industry standards; and that the results confirmed acceptable performance of the battery.

The team inspected the design, testing, and operation of battery charger D12 to determine whether it could perform its design basis functions. The team reviewed design calculations, drawings, and vendor specifications for battery charger sizing and load profile studies to evaluate its capability. The team reviewed maintenance and test procedures to determine whether they were adequate to ensure reliable operation and they were performed in accordance with licensing basis requirements, industry standards, and vendor recommendations. The team compared as-found and as-left inspection and test results to established acceptance criteria to verify the charger's capability conformed to design basis requirements.

The team interviewed system and design engineers and walked down the battery and charger to independently assess the material condition and to determine if the system alignment and operating environment were consistent with design assumptions. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.14 Emergency Diesel Generator ‘A’ (Electrical)

a. Inspection Scope

The team inspected the ‘A’ EDG electrical systems to evaluate if they were capable of operating during design basis events. The team reviewed loading and voltage regulation calculations, including the bases for brake horsepower values used, to verify that design bases and design assumptions have been appropriately translated into the design calculations. The team reviewed analyses and surveillance testing to assess EDG capability under required operating conditions. The team also reviewed calculations, operating procedures and technical evaluations to verify that steady-state and transient loading are within design capabilities, adequate voltage would be present to start and operate connected loads, and operation at maximum allowed frequency would be within the design capabilities. The team reviewed the EDG load sequence time delay setpoints, calibration intervals, and results of last calibration for accuracy to determine if the results were consistent with the design requirements. The team also performed a visual inspection of the EDG to assess the installation configuration, material condition, and potential vulnerability to hazards.

The team reviewed protection, coordination and short-circuit calculations to verify that the EDG was adequately protected with properly set protective devices during test mode and emergency operation under worst fault conditions. The team’s review included the interfaces and interlocks associated with 4.16 kV Bus A5, including voltage protection schemes that initiate connection to the EDG to verify adequacy. The team reviewed the setpoint calculations, calibration procedures, and latest surveillance results, for the voltage detection relays, including applicable time delays to ensure test acceptance criteria and results were consistent with design assumptions. The team interviewed system and design engineers and walked down the EDG to independently assess the material condition and to determine if the system alignment and operating environment were consistent with design assumptions. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.15 Startup Transformer Feeder Breakers 152-504 and 152-604

a. Inspection Scope

The team inspected the startup transformer feeder breakers 152-504 and 152-604 to determine if they were capable of supporting their design basis function of to supplying 4.16 kV electrical power to safety-related buses A5 and A6, respectively. The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify the design basis requirements for the breakers. The team reviewed schematic diagrams and selected calculations for the electrical distribution system load flow/voltage drop, and electrical protection and coordination. The adequacy and appropriateness of design assumptions for the calculations were reviewed to verify that breaker capacity was not exceeded under design basis conditions. The switchgear's protective device settings and breaker ratings were reviewed to ensure that selective coordination was adequate for protection of connected equipment. The team also reviewed maintenance procedures, completed work records and preventive maintenance activities to determine whether the breakers were being properly maintained. The team conducted a walkdown of the breakers to evaluate the material condition and the operating environment for indications of degradation of equipment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.16 Unit Auxiliary Transformer Feeder Breakers 152-505 and 152-605

a. Inspection Scope

The team inspected the unit auxiliary transformer feeder breakers 152-505 and 152-605 to determine if they were capable of supporting their design basis function of to supplying 4.16 kV electrical power to safety-related buses A5 and A6, respectively.

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify the design basis requirements for the breakers. The team reviewed schematic diagrams and selected calculations for the electrical distribution system load flow/voltage drop, and electrical protection and coordination. The adequacy and appropriateness of design assumptions for the calculations were reviewed to verify that breaker capacity was not exceeded under design basis conditions. The switchgear's protective device settings and breaker ratings were reviewed to ensure that selective coordination was adequate for protection of connected equipment. The team also reviewed maintenance procedures, completed work records and preventive maintenance activities to determine whether the breakers were being properly maintained. The team conducted a walkdown of the breakers to evaluate the material condition and the operating environment for indications of degradation of equipment. Finally, the team reviewed corrective action documents and system health reports to evaluate whether there were any adverse operating trends and to assess Entergy's ability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.2 Review of Industry Operating Experience and Generic Issues (4 samples)

The team reviewed selected OE issues for applicability at the Pilgrim Nuclear Power Station. The team performed a detailed review of the OE issues listed below to evaluate whether Entergy had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.2.1 NRC Information Notice 2012-11: Age Related Capacitor Degradation

a. Inspection Scope

The team reviewed Entergy's evaluation of NRC Information Notice (IN) 2012-11, "Age Related Capacitor Degradation," in order to evaluate Entergy's response to the operating experience. The NRC issued the IN to alert licensees of recently problems involving age-related degradation of capacitors at various nuclear power plants. The team reviewed Entergy's evaluation of the potential impact of the identified issues to determine if the issues in the IN were applicable to Pilgrim. To further assess Entergy's current maintenance practices, the team reviewed a sample of Entergy's preventive maintenance basis documents for safety-related components containing capacitors (e.g., chargers, inverters, and power supplies) to assess the maintenance history and to determine if vendor/industry recommendations were being properly considered in establishing preventive maintenance practices and replacement intervals appropriate to the circuit application.

b. Findings

No findings were identified.

.2.2.2 NRC Information Notice 2012-14: Motor-Operated Valve Inoperable Due to Stem-Disc Separation

a. Inspection Scope

NRC IN 2012-14 informed licensees about operating experience involving an MOV that failed at the connection between the valve stem and disc. The team reviewed Entergy's applicability review and disposition of NRC IN 2012-14 and the MOV Program as it related the issues identified in this IN. The team reviewed the associated corrective action program document, CR-PNP-2012-0333, which included a review of the root cause associated with the specific event discussed in the IN, the impact of why the failed valve was exempted from the NRC Generic Letter 96-05 Program, why the failed valve was not properly tested as part of the IST program, and how Entergy's test program complies with testing requirements. The team also reviewed Entergy's assessment of how design changes to key MOVs may have affected the original design basis. Finally, the team reviewed open corrective actions and practices associated with valve position indication verification, which is being evaluated generically in the nuclear industry as they relate to the IST Program.

b. Findings

No findings were identified.

.2.2.3 NRC Information Notice 2013-12: Improperly Sloped Instrument Sensing Lines

a. Inspection Scope

The team reviewed Entergy's evaluation of NRC IN 2013-12, "Improperly Sloped Instrument Sensing Lines." The IN described the NRC's review of recent operating experience regarding instrument sensing line sloping problems caused by improper design or installation. These sensing lines are relied upon to perform required safety functions, such as to initiate reactor trips, control flows, maintain proper fluid levels, actuate emergency systems and provide operators information to be used as the basis for required actions. The team reviewed Entergy's evaluation for applicability of the issues at Pilgrim. The team reviewed and discussed the corrective actions taken and extent of condition reviewed with engineering personnel. The team reviewed instrumentation and controls backfill, maintenance and inspection procedures to ascertain Pilgrim's understanding of appropriate slope to or from the process connection for safety-related instrument and sensing lines based on whether the sensing lines are filled with liquid or gas.

b. Findings

No findings were identified.

.2.2.4 NRC Information Notice 2013-14: Potential Design Deficiency in Motor-Operated Valve Control Circuitry

a. Inspection Scope

The team inspected Entergy's review of NRC IN 2013-14, "Potential Design Deficiency in Motor-Operated Valve Control Circuitry." The IN described the NRC's review of recent operating experience involving a potential control circuit design deficiency in MOVs that could result in incorrect valve position indication with the valve in an improper position during a postulated loss-of-coolant accident (LOCA). The team reviewed Entergy's evaluation of the IN to determine if the issues were directly applicable to Pilgrim, and that appropriate corrective actions were taken, if applicable. The team reviewed Entergy's postulated design basis LOCA with power interrupted to MOV actuators to ensure that the circuitry would perform its intended function upon restoration of power to the actuators. The team evaluated the adequacy of Entergy's evaluation of the IN by reviewing specific condition reports and MOV test results; and by conducting interviews with Entergy personnel.

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 Entergy identified and entered into their corrective action program. The team reviewed these issues to evaluate whether Entergy had an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, corrective action documents written on issues identified during the inspection were reviewed to evaluate adequate problem identification and incorporation of the problem into the corrective action program. The 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

On June 19, 2014, the team presented the inspection results to Mr. D. Noyes, Acting Site Vice President, Pilgrim Nuclear Power Station, and other members of Entergy staff. The team verified that none of the information in this report is proprietary.

Attachment: Supplemental Information

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
B. Barrus, System Engineer
D. Berkland, Senior Design Engineer
R. Blagbrough, System Engineer
R. Byrne, Senior Engineer
S. Das, Senior Lead Design Engineer
P. Glover, System Engineer
P. Harizi, Senior Staff Engineer
M. McClellan, Senior Lead Design Engineer
R. Morris, System Engineer
J. O'Donnel, System Engineer
B. Rancourt, Senior Lead Design Engineer
D. Sitkowski, Senior Design Engineer
P. Smith, Senior Design Engineer
M. Williams, Technical Specialist

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened/Closed

None.

Discussed

None.

LIST OF DOCUMENTS REVIEWED

Calculations:

155, Bypass Flow through CRD Seals to Satisfy NUREG-0619, Revision 0
162, Bypass Flow through CRD Seals to Satisfy NUREG-0619 and Support Cut and Cap PDCR, Revision 0
81-18, Minimum CRD Flow, Revision 0
C15.03381, Allowable Additional Secondary Containment Leakage Area and Gaps at Secondary Containment Doors, Revision 5
EC-04035, IN1-299, IST Instrument Calculation, Revision 0
EC-41457, Degraded Voltage Trip Relays, Revised Voltage Setpoint, Revision 2
IN1-31, Core Spray Flow Indicator Uncertainty Calculation FI 1450A/B, Revision 1
IN1-134, Setpoint Calculation for PIS1001-89A, B, C, and D, Revision 0
IN1-214, Uncertainty Calculation for RHR Flow Indicators FI-1040 1A /B and 2A /B, Revision 6
IN1-215, Uncertainty Calculation for RHR Flow Indicators FI-1040-11A/B, Revision 4
IN1-253, Uncertainty Calculation for X107A/B Frequency Meters/Speed Controls, Revision 0
IN1-299, IST Instrument Calculation, Revision 0
M-1142, Thrust and Torque Calculation for MO-1400-4A, Revision 2
M-1143, Thrust and Torque Calculation for MO-1400-4B, Revision 2
M-1146, Thrust and Torque Calculation for MO-1400-25A, Revision 3
M-1147, Thrust and Torque Calculation for MO-1400-25B, Revision 2
M1276, EDG X-107A/B Design Basis Thermal Operating Limits, Revision 0
M1289, EDG Air Start System Design Basis Evaluation, Revision 0
M186, RBCCW Heat Exchanger Check Rated Duty and Performance Curves Developed for Various Design Flows, Revision 1
M235, RBCCW Heat Exchanger (E209A/B) Determination of Limiting SSW DP, Revision 0
M290, RBCCW Heat Exchanger Tube Plugging Limit, Revision 0
M-401, Maximum ADS Accumulator Pressure Due to Drywell Temperature Increase from a Main Steam Line Break, Revision 0
M-405, ADS Accumulators T-221 A, B, C, D with Relief Valves Set at 120 psig, Revision 0
M-493, Turbine Building Ventilation – Compensatory Measures – One Supply Fan – No Exhaust Dampers Open, Revision 0
M-505, Evaluation of the Original Design Criteria for MOV-1400-4A, Revision 0
M-517-1, RHR Pump Minimum Flow Line Flow Rate, Revision 0
M-538, Hydraulic Calculation for AFPC Mode 1, Revision 0
M-563, AC Motor Operated Valve Design Basis Review, Revision 9
M589, Emergency Diesel Generator Cooling System Evaluation, Revision 1
M-600, MOV Pressure Locking and Thermal Binding Evaluation, Revision 4
M-615, MOV Thrust/Torque Calculation for Priority 5 MOVs, Revision 3
M-636, MOV Weak Link Summary, Revision 7
M641, RBCCW Heat Exchanger Performance, Revision 0
M-662, RHR and Core Spray Pump NPSH and Suction Pressure Drop, Revision E4
M-667, RHR System Hydraulic Analysis, Revision 2
M-734, RHR and Core Spray Pump Suction Strainer Debris Head Loss NPSH, Revision 2
M-736, Evaluation of the Fire Protection Piping for Seismic Class II/I Concerns, Revision 0
M-770, RBCCW System Hydraulic Analysis, Revision 0
M-772, Evaluation of MOV Coefficients of Friction, Revision 0

M824, Temperature Limits of Operation for Pilgrim EDGs, Revision 0
M-897, PNPS ECCS Strainer Performance Analysis, Revision 3
M-898, Estimation of Debris Generation/Transport to Suppression Pool after LOCA, Revision 1
M-964, Core Spray System Hydraulic Analysis, Revision 0
MRBD14, Maintenance Rule Basis Document, Core Spray, 4/11/14
NESG-#01-164, Determination of MOV Risk Categorization, 10/29/01
PS-126, Setpoint Calculation for EDG Time Delay Relays (162-509/609), Revision 1
PS-127, Setpoint Calculation for Bus A5/A6 Loss of Voltage Relays, Revision 0
PS-132, Electrical Performance and Stroke Timing of Priority 2 AC MOVs, Revision 3
PS-133, Electrical Performance and Stroke Timing of Priority 3 AC MOVs, Revision 2
PS-134, Electrical Performance and Stroke Timing of Priority 4 AC MOVs, Revision 2
PS-135, Electrical Performance and Stroke Timing of Priority 5 AC MOVs, Revision 0
PS-164, Setpoint for Anti-Cycling Relays 127-504Y/TDDO and 127-604Y/TDDO, Revision 0
PS-217, Setpoint for 127-504/1, 2 and127-604/1, 2 Startup Transformer UV Relays, Revision 0
PS-220, Setpoint Calculation/ADS Timers (2E-K20A/B, 2E-K21A/B and 2E-K24A/B), Revision 0
PS-233A, DC System Analysis, Methodology/Scenario Development Calculation, Revision 0
PS-233C, 125 Volt Battery ‘B’ System Voltage Calculation, Revision 2
PS-235, Uncertainty for EDG Voltage Regulator and C3 Panel Voltmeter Settings, Revision 0
PS-239, ETAP AC Load Flow Calculation, Revision 0
PS-240, ETAP AC Short Circuit Analysis, Revision 0
PS-242, ETAP EDG ‘A’ Dynamic Loading Calculation Comment Sheet, Revision 0
PS-246, ETAP Model Input Calculation, Revision 7
PS-247, Acceleration Time for CS Motors, Revision 0
PS-30, Coordination Calculation, Revision 1
PS-79, Emergency Diesel Generator Loading, Revision 6
S&SA055, EDG Low Sulfur Fuel Consumption and Ultra Low Sulfur Density Limits over Seven Days in Response to a LOCA with LOOP, Revision 6
S046, ADS Accumulator Post Accident Operability Time, Revision 0

Completed Surveillance and Modification Acceptance Testing:
2.1.12.1, EDG ‘A’ (X-107A) Surveillance, performed 9/22/12
2.1.12.1, Emergency Diesel Generator Surveillance, performed 10/29/11, 11/20/11, 4/28/12, 9/23/12, 12/2/12, 3/17/13, 5/11/13, 4/12/14 and 4/27/14
2.1.19, SP Chamber Temperatures, performed 12/12/07, 4/7/08, 5/18/09, 5/12/11, and 5/29/13
3.M.3-42, Battery Charger Maintenance and Calibration, performed 6/25/12
3.M.3-45, 125V DC Distribution Panel ‘C’ (D6) Automatic Transfer Switches Functional Testing and Relay Calibration, performed 4/25/11, 5/15/13 and 2/8/14
3.M.3-47.1, Functional Test of Load Shed for ‘A’ CRD Pump P-209A, performed 9/6/11
3.M.3-5, 4kV Ground Device 152-GTD-02, performed 4/24/13
3.M.3-5/3.M.3-5.5, 4kV Breaker Maintenance, 152-504/Cable (A5-4), performed 5/5/11, 5/9/11
3.M.3-5/3.M.3-5.6, 4kV Breaker Maintenance, 152-604 and Cable A 6-6), performed 5/8/13
3.M.3-5/3.M.3-5.6, 4kV Breaker Maintenance, 152-605 and Cable (A6-7), performed 6/1/13
3.M.3-6, 480V Load Center Breaker Preventive Maintenance, performed 4/24/13
3.M.3-6.4, 480V Load Center Preventive Maintenance, performed 4/24/13
3.M.3-61.5 Attachment 1C and 1E, EDG Refuel PM (X-107A), performed 12/6/12
3.M.3-61.5, EDG Two-Year Overhaul PM – Critical Maintenance, performed 12/05/12
3.M.4-14, Rotating Equipment Inspection/Assembly/Disassembly (P-209B), performed 4/18/12
3.M.4-17.4, Lubrication Sampling and Change Procedure (EDG X-107A), performed 4/30/14
3.M.4-17.4, Lubrication Sampling and Change Procedure (P-209B), performed 4/18/12

8.5.3.1, RBCCW System Quarterly and Biennial Comprehensive Operability, performed 6/10/14
8.5.3.14, SSW Flow Rate Operability Test (RBCCW Loop 'A' HX), monthly results, performed 1/3/11 through 5/1/14
8.5.6.2, Special Test for ADS System Manual Opening of Relief Valves, performed 12/12/07, 4/7/08, 5/18/09, 5/12/11 and 5/29/13
8.7.42, PCAC Valve Quarterly Operability, performed 3/9/11, 6/7/11, 9/5/11, 12/5/11, 7/7/12, 9/10/12, 12/7/12, 3/15/13, 6/4/13, 12/9/13, and 3/22/14
8.9.1.1, EDG Oil Transfer System Skid-Mounted Valve Operability/Supplemental Pump Testing, performed 1/31/11, 7/5/11, 1/3/12, 6/4/12, 12/31/12, 4/25/13, 7/30/13 and 2/5/14
8.9.8.2, 125 Vdc 'B' Battery Acceptance, Performance, or Service Test, performed 5/3/11
8.C.16.3, 125 Vdc 'B' Battery Quarterly Inspection/Surveillance, performed 6/24/11
8.E.30.1, CCWS Instrumentation Calibration and Functional Test, performed 5/16/12 and 2/6/14
8.M.1-32.5, Analog Trip System Trip Unit Calibration Cabinet C2233A Section A, Attachment 1, performed 1/3/14 and 1/3/14
8.M.1-32.5.1, Analog Trip System - Trip Unit Calibration with Gross Fail Check Cabinet C2233A Section A, Attachment 1, 2 and 3, performed 3/4/14
8.M.1-32.6, Analog Trip System Trip Unit Calibration Cabinet C2233A Section B, performed 12/30/13 and 4/4/14
8.M.1-32.6.1, Analog Trip System - Trip Unit Calibration with Gross Fail Check Cabinet C2233A Section B, performed 7/5/13
8.M.2-8.1, Calibration of ATS Transmitters Rack C2205, performed 4/16/13
8.Q.3-3, 480 Vac MCC Testing and Maintenance, performed 6/24/13
8.Q.3-4, 125/250 Vdc MCC and Breaker Panel Testing and Maintenance, performed 5/4/11, 5/1/13 and 6/18/14
Baker Test Results, RHR pump motor P-203A, performed 1/8/14
Baker Test Results, RHR pump motor P-203B, performed 1/6/14
Baker Test Results, RHR pump motor P-203C, performed 1/8/14
Baker Test Results, RHR pump motor P-203D, performed 1/6/14
Core Spray Pump P215A, Test Trend/Graph (8.5.2.2.1, LPCI Loop 'A'), 3/2003 to 3/2014
GE-Hitachi Overhaul of 4160 Vac Breaker 152-504 (S/N 0209A2839-017), performed 4/12/11
GE-Hitachi Overhaul of 4160 Vac Breaker 152-505 (S/N 0209A2839-018), performed 4/13/11
MO-1400-25A, Diagnostic Test Data (8.I.11.11, RCS Isolation Valves), 4/1995 to 5/2013
MO-1400-25A, Stroke Time Trend/Graph (8.I.11.11, RCS Isolation Valves), 5/1993 to 5/2014
MO-1400-4A, Diagnostic Test Data (8.I.11.11, RCS Isolation Valves), 3/1997 to 5/2013
MO-1400-4A, Stroke Time Trends (8.I.11.11, RCS Isolation Valves), 3/2006 to 3/2014
MPR-4031, EDG-A March 2014 Pre-Maintenance Engine Signature Analysis Results, May 2014
RHR P203A, Pump Test Trend/Graph (8.5.2.2.1, LPCI Loop 'A'), 4/2003 to 4/2014

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CR-PNP-2009-02536
CR-PNP-2009-05250
CR-PNP-2010-02857
CR-PNP-2010-04095
CR-PNP-2011-01610
CR-PNP-2011-01704
CR-PNP-2011-01721
CR-PNP-2011-02390
CR-PNP-2011-03342
CR-PNP-2011-04182
CR-PNP-2011-04285
CR-PNP-2011-04495
CR-PNP-2011-04499
CR-PNP-2011-04823
CR-PNP-2012-00190
CR-PNP-2012-00218
CR-PNP-2012-00237
CR-PNP-2012-00289
CR-PNP-2012-00301
CR-PNP-2012-02029
CR-PNP-2012-03331
CR-PNP-2012-03333
CR-PNP-2012-03991
CR-PNP-2012-04293
CR-PNP-2012-05034
CR-PNP-2013-00378
CR-PNP-2013-00610

CR-PNP-2013-00613
CR-PNP-2013-00665
CR-PNP-2013-00853
CR-PNP-2013-01148
CR-PNP-2013-01621
CR-PNP-2013-01671
CR-PNP-2013-01784
CR-PNP-2013-01903
CR-PNP-2013-02887
CR-PNP-2013-03603
CR-PNP-2013-04603
CR-PNP-2013-05437
CR-PNP-2013-05465
CR-PNP-2013-05712
CR-PNP-2013-06283*
CR-PNP-2013-06390
CR-PNP-2013-06982
CR-PNP-2013-07328
CR-PNP-2013-08002
CR-PNP-2013-08329
CR-PNP-2014-00016
CR-PNP-2014-00217
CR-PNP-2014-00252
CR-PNP-2014-00635
CR-PNP-2014-00636
CR-PNP-2014-00998
CR-PNP-2014-01741
CR-PNP-2014-02295*
CR-PNP-2014-02303
CR-PNP-2014-02328*
CR-PNP-2014-02353
CR-PNP-2014-02362*
CR-PNP-2014-02390
CR-PNP-2014-02436
CR-PNP-2014-02500*
CR-PNP-2014-02501*
CR-PNP-2014-02503*
CR-PNP-2014-02523*
CR-PNP-2014-02530*
CR-PNP-2014-02541*
CR-PNP-2014-02563*
CR-PNP-2014-02569*
CR-PNP-2014-02578*
CR-PNP-2014-02670*
CR-PNP-2014-02806*
CR-PNP-2014-02822*
CR-PNP-2014-02839*
CR-PNP-2014-02845*
LBDCR-2014-004*
WT-WTPNP-2014-00151*

*NRC identified during this inspection.

Drawings:
2231-14-1, RHR Pump Cross Section, Revision E1
2249-13-1, Core Spray Pump Seal, Revision 0
2249-9-3, Assembly Drawing Core Spray Pumps, Revision E1
2331-55-1, P-203C Pump Performance Curve, Revision 1
2331-57-1, P-203B Pump Performance Curve, Revision 1
2331-59-1, P-203A Pump Performance Curve, Revision 1
2331-66-1, P-203D RHR Pump Curve, Revision 0
2D-85368, Core Spray Pump Seal, Type PTO Dura Seal, Revision 1
DS-M-9-1-P, Horizontal Centrifugal Pump Data Sheet, Revision 0
E13, Single Line Relay and Meter Diagram 125 Vdc and 250 Vdc Systems, Revision E80
E14, Sht. 1, Single Line Diagram 120 Vac Instrument AC Vital and Reactor Protection AC Systems and 24Vdc Power System, Revision 39
E176, Sht. 1, Reactor Building Closed Cooling Water System, Revision E8
E18, Schematic Diagram, Diesel Generator Load Shedding, Revision E18
E37, Schematic Diagram, 4160V System Breakers 152-505 and 152-605, Revision E8
E38, Schematic Diagram, 4160V System Breakers 152-504 and 152-604, Revision 15
E40, Schematic Diagram, 4160V System Breakers 152-509 and 152-609, Revision 26
E5004, Electrical Schematic Diagram Containment Spray Motor Operated Valves, Revision E13
E5005, Residual Heat Removal System Motor Operated Valves, Revision E11
E5052, Schematic Diagram RHR System Pumps P203A, P203B, P203C, P203D, Revision E0
E5-200, Sht. 1, 4160V Switchgear Relay Settings, Revision 13
E5-200, Sht. 5, 4160V Switchgear Relay Settings, Revision 11
E54A88, Sht. 1, Outline Drawing Limitorque Operator, Revision E6

E727, Elementary Diagram ECCS Analog Trip Cabinet C2233A Section A, Revision E7
E728, Elementary Diagram ECCS Analog Trip Cabinet C2233A Section B, Revision E7
E729, Elementary Diagram ECCS Analog Trip Cabinet C2233B Section A, Revision E7
E730, Elementary Diagram ECCS Analog Trip Cabinet C2233B Section B, Revision E7
E8-13-8, Arrangement Drawing Motor Control Center, Revision 58
M10-24-1, CRD System CRD Pump Suction Filter Assembly X234A and X234B, Revision E0
M105, Motor Operated Valve Data Sheet, Revision E6
M105-11-5, Valve Assembly Core Spray System 10" MOV MO1400-25A/B, Revision E9
M106-6-2, Outline Drawing Limitorque Operator, Revision E2
M11-26-2, Sht. 1, RBCCW Loop Cooling Heat Exchanger E209A/B Tube Layout, Revision E2
M11-51-2, Sht. 1, Cooling Water Heat Exchanger E209A, Revision E3
M11-68-1, Sht. 1, RBCCW Heat Exchanger E209A Channel and Shell Details, Revision E5
M11-84, RBCCW and TBCCW Heat Exchanger Tube Sleeve Details, Revision 0
M132-72-3, 6IN 300LB Gate Valve RS Metal Seal Forged SST Butt Weld, Revision E5
M132DS-CVR, Sht.1, Carbon Steel Gate and Globe and Check Valves Data Sheet, Revision E3
M16, Equipment Location, Reactor Building Plan Ground Floor-EL. 23'-0, Revision 30
M1D12-4, Process Diagram CRD Hydraulic System, Revision E7
M1H7-12, Sht. 3, Residual Heat Removal System, Revision E21
M1K4-11, Sht. 2, Core Spray System, Revision E16
M1R4-10, Elementary Diagram Automatic Blowdown System, Revision 25
M1R8-2, Elementary Diagram Automatic Blowdown System, Revision 10
M209ADS11, Data Sheet Core Spray Pump Discharge, Revision E0
M215, Sht. 1, Cooling Water System Reactor Building, Revision 52
M215, Sht. 5, Cooling Water System Reactor Building, Revision E8
M227, Sht. 1, Containment Atmospheric Control System, Revision 60
M241, Sht. 1, Residual Heat Removal System, Revision 87
M241, Sht. 2, Residual Heat Removal System, Revision 48
M242, Core Spray System, Revision 53
M250, Sht. 1, PID Control Rod Drive Hydraulic System, Revision 75
M250, Sht. 2, PID Control Rod Drive Hydraulic System, Revision 17
M288, Turbine Building Air Flow Diagram, Revision 15
M-420, Sht. 6, Functional Description AC Power Systems – 4160V Systems Breaker A104, 204, 304, 404, 504, 505 and 604 Controls, Revision E4
M51, Piping and Mechanical Torus and Reactor Auxiliary Bay Area 1&2, Revision 52
M6-137, Sht. 1, EDG Air Start Motor/Cam Gear Cover Arrangement, Revision 2
M6-21-11, Sht. 1, Wiring Diagram Diesel Generator 'A' Alco Alternator, Revision 17
M6-22-14, Sht. 1, Schematic Diagram Diesel Generator 'A' X107A Engine Control, Revision 38
M6-32-3, Sht. 1, Diesel Generator X107A Lube Oil System, Revision E9
M6-3-4, Sht. 1, Outline Drawing Diesel Engine Silencer EDG X-107A and X-107B, Revision E1
M6-85, Sht. 1, EDG Fuel Oil Piping Assembly, Revision E0
M9-11-1, Worthington Corporation 2WTF-810 10-Stage CRD Pump Curve, dated 6/12/70
M9-2-3, CRD Hydraulic System CRD Pumps P209A and P209B, Revision E1
MD-20FSK-145, Radwaste Start-up Sys #49, Revision 1
MMOV3, Motor Operated Valve Information Sheet, Revision 46
MMOV4, Motor Operated Valve Information Sheet, Revision 34
SE155, Sht. 1, Electrical Single Line Composite Diagram, 4.16 kV/480V Systems, Revision 42
S-M-412, Cooling Water System Reactor Building, Revision E7

Engineering Evaluations/Modifications:
EC-11485, Replacement Motor for MO-1400-25A, 3/30/09
EC-27120, New Tube Sleeve Design for RBCCW and TBCCW Heat Exchangers, Revision 0
EC-34149, Replace RHR Pump P-203A Motor, Revision 0
EC-51158, Emergency Diesel Generator Loading, Revision 0
ER-02115031, Change Orientation of PSV-8008, 3/10/06
PDC-02-59, MOV Modifications, 8/12/82
PDC-79-28A.1, Installation of Alternate Shutdown System, Rev. 0
PDC-87-34, MO-1400 4A/4B Core Spray Valve Yoke Replacement, 4/29/87
PDC-94-18H, Modification to MO-1400-25A, for NRC Generic Letter 89-10, 9/13/94
PDC-96-08C, Modification to MO-1400-4A/4B for NRC Generic Letter 89-10, 8/12/96
PDC-98-21, MOV Modifications, 1/12/04
PNPS-RPT-04-004, PNPS Air-Operated Valve Categorization, Revision 3

Licensing and Design Basis Documentation:
Letter 82-180, Boston Edison Co. to NRC, Boston Edison Response to Appendix R, 6/25/82
Letter 96-037, Boston Edison Co. to NRC, Pilgrim's Response to Generic Letter 96-01, 4/19/96
M1201, System Design Basis Review for PCAC System Valves, Revision 0
PNPS-FSAR, Revision 29
SDBD-01, Design Basis Document for ADS/MS, Revision 1
SDBD-03, Design Basis Document for Control Rod Drive System, Revision 2
SDBD-10, Design Basis Document for Residual Heat Removal System, Revision 3
SDBD-14, Design Basis Document for Core Spray System, Revision 1
SDBD-29, Design Basis Document for Salt Water Service System, Revision E1
SDBD-46E, Design Basis Document for AC Electrical Distribution System, Revision 1
SDBD-46G, Design Basis Document for DC Power System, Revision 1
SDBD-61, Design Basis Document for Emergency Diesel Generator, Revision 2
TDBD-107, Design Basis Document for Motor Operated Valves/GL-89-10, Revision 3

Miscellaneous Documents:
11-15-83, Purge and Vent Valve Operability Qualification Analysis, Revision 1
3AFE 6873 5190, Capacitor Reforming Inspection Instructions, Revision G
Boston Edison Memorandum FS&MC 89-253, Pump BHP for Diesel Generator Loading, Attachment 1, Response to Diesel Generator Loading Questions, 4/12/89
C-39863, Reactor Building Cooling Water Pump P-202-A, B, C, D, E, and F, Revision 3
CR-PNP-2013-378, Root Cause Evaluation Report Safety Relief valves Pilot Leaks, Revision 1
DS-M-9-1P, Horizontal Centrifugal Pump Data Sheet – CRD System Pumps, Revision 0
E-347A, Specification for Electrical Cable-Design, Procurement, Installation, Termination and Miscellaneous Electrical Items, Revision E24
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2.2.19.5, RHR Modes of Operation for Transients, Revision 26
2.2.20, Core Spray, Revision 81
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2.2.7, 480 Vac System, Revision 31
2.2.78, Reactor Building Truck Lock Doors, Revision 34
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3.M.2-12.3, Backfilling Condensing Chambers 12B and 13B, Active Leg and Instrument Lines from Racks C2206, C2276, C2252, Revision 29
3.M.2-12.5.1, Backfill Instrument Sensing Lines for DPIS-1360-1A, DPIS-1360-1B, and FT-1360-4 for RCIC System, Revision 2
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3.M.3-5, GE Magneblast Medium Voltage Breaker PM Procedure, Revision 39
3.M.3-51, Electrical Termination Procedure, Revision 31
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8.5.2.3, LPCI and Containment Cooling MOV Operability Test, Revision 51
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8.7.1.5, Local Leak Rate Testing of Primary Containment Penetrations, Isolation Valves, and Inspection of Containment Structure, Revision 64
8.7.4.2, Primary Containment Atmospheric Control Valve Quarterly Operability, Revision 13
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8.7.4.8.6, PASS Panel Water Isolation Valve Position Indication Verification, Revision 0
8.9.8.1, 'A' 125 Vdc Battery Acceptance, Performance, or Service Test, Revision 21
8.9.8.2, 'B' 125 Vdc Battery Acceptance, Performance, or Service Test, Revision 24
8.9.8.3, 250 Vdc Battery Acceptance, Performance, or Service Test, Revision 22
8.C.42, Sub-compartment Barrier Control Surveillance, Revision 25
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Program Health Report, In-Service Testing, Q4-2013
Program Health Report, Large Motors, Q3-2013
Program Health Report, Motor-Operated Valves, Q3-2013
Program Health Report, Relief Valves, Q3-2013
System Health Report, 4kV System, Q4-2013
System Health Report, Control Rod Drive, Q4-2013
System Health Report, Core Spray, Q4-2013
System Health Report, DC Power, Q4-2013
System Health Report, Emergency Diesels and Fuel, Q4-2013
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System Health Report, Residual Heat Removal, Q4-2013
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V-0390, Limitorque Valve Controls, Revision 34
V-0441, Walworth Gate, Globe, Swing Check Valves, Revision 32
V-0454, Emergency Diesel Generators – ALCO 251F, Revision 78
V-1041, Engineering and Fabricators, Inc., Heat Exchangers, Revision 12

Work Orders:

00133198	52245550	52314588	52370370	52459853
00146307	52261107	52314590	52376535	52462040
00169950	52266226	52314753	52396331	52471226
00245969	52283953	52337934	52401367	52494560
00326892	52284086	52338314	52406010	52505191
51539986	52289647	52342787	52407870	52514761
51665953	52313480	52350069	52407871	52515346
51674422	52313883	52355678	52407878	52519953
51693128	52314104	52362578	52414440	52519954
51796836	52314143	52366154	52417074	52519956
52185744	52314321	52366879	52426997	52531824
52190881	52314323	52367809	52428467	52535367
52191000	52314405	52367877	52447629	52536737
52240225	52314475	52369192	52457527	62384729

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Document Management System
ADS	Automatic Depressurization System
RBCCW	Reactor Building Closed Cooling Water
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
DBD	Design Basis Document
DC	Direct Current
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
IN	[NRC] Information Notice
IST	In-Service Testing
kV	Kilovolts
LERF	Large Early Release Frequency
LOCA	Loss-of-Coolant Accident
MOV	Motor-Operated Valve
NRC	Nuclear Regulatory Commission
OE	Operating Experience
RHR	Residual Heat Removal
SRV	Safety Relief Valve
SSW	Salt Service Water
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current