June 8, 2007

Mr. Gene St. Pierre
Site Vice President
FPL Energy Seabrook, LLC
Seabrook Station
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION - NRC COMPONENT DESIGN BASIS INSPECTION REPORT 05000443/2007006

Dear Mr. St. Pierre:

On April 26, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Seabrook Nuclear Power Station. The enclosed inspection report documents the inspection results, which were discussed on April 26, 2007, with you 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 also reviewed FPL's response to selected operating experience issues. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents two findings of very low safety significance (Green), both of which involved violations of NRC requirements. However, because of the very low safety significance and because the issues have been entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest any NCV in this report, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, 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 Seabrook.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

Docket No. 50-443
License No: NPF-86

Enclosure: Inspection Report No. 05000443/2007006
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	05000443
License No:	NPF-86
Report No:	05000443/2007006
Licensee:	Florida Power & Light Energy Seabrook, LLC (FPL)
Facility:	Seabrook Station, Unit 1
Location:	Post Office Box 300 Seabrook, New Hampshire 03874
Inspection Period:	March 19 - April 26, 2007
Inspectors:	J. Schoppy, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader J. Kulp, Reactor Inspector, DRS J. Richmond, Senior Reactor Inspector, DRS M. Snell, Reactor Inspector, DRS L. Hajos, NRC Electrical Contractor S. Spiegelman, NRC Mechanical Contractor
Approved By:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000443/2007006; 3/19/2007 - 4/26/2007; Seabrook Station, Unit 1; Component Design Bases Inspection.

This inspection was conducted by a team of four NRC inspectors and two NRC contractors. Two findings of very low risk significance (Green) were identified, both of which were considered to be non-cited violations (NCV's). 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). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10CFR50, Appendix B, Criteria III, Design Control. Specifically, the instrument uncertainty calculation for the refueling water storage tank (RWST) level instruments took credit for instrument temperature compensation; however, the instruments were not temperature compensated. Additional inaccuracies associated with the bulk temperature mismatch and air pressure differences resulted in a non-conservative RWST level error. In response, FPL implemented a compensatory action to maintain adequate margin to the Technical Specification (TS) limit until engineering modified the level measurement to include temperature compensation.

  The finding is more than minor because it is associated with the design control attribute of the Mitigating Systems cornerstone objective of ensuring availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. This finding was determined to be of very low significance, based on Phase 1 of the SDP, because it did not result in the loss of RWST operability. (Section 1R21.2.1.1)

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR 50, Appendix B, Criterion XI, Test Control. The team determined that FPL did not ensure that the turbine driven emergency feedwater pump (TDEFWP) steam admission valve, MS-V-395, inservice test (IST) procedures had acceptance criteria that incorporated the limits from applicable design documents. Specifically, the design basis stroke time of MS-V-395 was not correctly stated in the IST program so that the valve stroked faster than the design basis requirement, but was still considered operable per IST requirements. Following identification of the issue, FPL declared the TDEFWP inoperable, entered the applicable TS, restored the valve stroke time to within its design basis range, and entered the issue into the corrective action program (CAP) for resolution.

The finding is more than minor, because it is associated with the procedural quality attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding was determined to be of very low significance, based on Phase 1 of the SDP, because it did not result in the loss of a safety function. (Section 1R21.2.1.2)

B. Licensee Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in Seabrook Station's Probabilistic Risk Assessment (PRA) and the U. S. Nuclear Regulatory Commissions's (NRC) Standardized Plant Analysis Risk (SPAR) model. Additionally, the Seabrook Significance Determination Process (SDP) Phase 2 Notebook, Revision 2, was referenced in the selection of potential components and actions for review. In general, this included components and operator actions that had a risk achievement worth (RAW) factor greater than 2.0 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were located within both safety related and non-safety related systems and included a variety of components, such as electrical buses, batteries, pumps, fans, diesel generators (DGs), heat exchangers (HXs), tanks, and valves. The components selected involved 12 different plant systems.

An initial list, consisting of over 50 components, was created based on the risk factors previously mentioned. A margin assessment was then performed to narrow this down to 17 components for a detailed design review. This design margin assessment considered original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. These included items such as failed performance test results, significant corrective action history, repeated maintenance, Maintenance Rule (MR) (a)(1) status, operability reviews for degraded conditions, NRC resident inspector input of problem equipment, system health reports and industry operating experience (OE). Consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins. The team also selected 4 operator actions for detailed review based on risk significance, time dependency of the actions, and factors affecting the likelihood of human error.

The inspection effort included walk-downs of selected components, including a review of selected simulator scenarios. It also included 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 both design bases and risk informed beyond design basis functions. A summary of the reviews performed for each component, operator action, operating experience sample, and the specific inspection findings identified are discussed in the following sections of the report. Documents reviewed for this inspection are listed in the attachment.

.2 Results of Detailed Reviews

.2.1 Detailed Component and System Reviews (17 samples)

.2.1.1 Refueling Water Storage Tank (CBS-TK-8)

a. Inspection Scope

The team evaluated the refueling water storage tank (RWST) relative to the following attributes: calculation of water volume in the tank and comparison with licensing basis documentation, height of water needed to preclude the formation of a vortex in the tank, accuracy of water measurement instrumentation and loop uncertainty analysis, past corrective action regarding water chemistry, and corrective actions developed and implemented during the inspection regarding temperature compensation. The team also conducted a detailed walkdown to visually inspect the physical/material condition of the tank and support systems and to ensure adequate configuration control.

b. Findings

Introduction. The team identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criteria III, Design Control, associated with a non-conservative instrument uncertainty calculation for RWST level.

Description. Seabrook Technical Specification (TS) 3.5.4 requires a minimum contained borated water volume of 477,000 gallons in the RWST to assure that 350,000 gallons of water is available for injection during an accident (Updated Final Safety Analysis Report (UFSAR) 6.3.2.8 and UFSAR Chapter 15 analysis). Operators rely on the RWST low level alarm (approach to TS alarm) and the Lo-Lo level alarm (at the TS limit) to maintain this required RWST inventory. Engineering established the alarm setpoints based on their Channel Statistical Accuracy evaluation that considered environmental conditions, system conditions and instrument error.

During the inspection, while responding to the team's request for the RWST level instrument loop analysis, engineering staff noted several deficiencies with the existing analysis. Specifically, the instrument uncertainty calculation took credit for instrument temperature compensation of the RWST level instruments as specified in the UFSAR; however, the instruments were not temperature compensated. Also, the calculation did not account for bulk temperature changes, increased water density due to borated water in the RWST, and several additional uncertainty terms in the analysis. On March 29, 2007, engineering initiated CR 07-04915 and performed a prompt operability assessment. Engineering determined that the RWST was operable but degraded. Operations implemented a compensatory action (Standing Order 07-002) to maintain adequate margin to the TS limit until engineering modified the level measurement on April 19 to include temperature compensation.

The team also identified additional inaccuracies associated with the bulk temperature mismatch (between the RWST and the level instrument standpipe) and the impact of air pressure differences (the RWST and pressure indicator were located in different rooms and ventilated by separate non-safety ventilation fans). In accounting for all of the above inaccuracies, the RWST low level alarm (approach to TS limit warning) would not have adequately ensured that FPL maintained the design basis RWST inventory. Based on a thorough review of historical values of actual RWST level and temperature, engineering determined that the RWST had remained operable. In the aggregate, the performance deficiency resulted in approximately 3 to 4" of non-conservative level error, leaving little or no margin to the TS level limit (over 1000 gallons of perceived margin was reduced to less than 300 gallons in some cases).

Analysis. The performance deficiency associated with this finding was that Seabrook engineering failed to properly account for RWST level uncertainties which resulted in a non-conservative level error. The issue was reasonably within FPL's ability to foresee and correct prior to March 2007. The team determined that the issue was more than minor because it was similar to Example 3.j in NRC IMC 0612 Appendix E, Examples of Minor Issues. Specifically, an engineering calculation error resulted in a condition where there was a reasonable doubt as to the RWST operability. In addition, the finding was more than minor because it affected the design control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The team reviewed this finding using the Phase 1 SDP worksheet for Mitigating Systems and determined that the finding was of very low safety significance (Green), because it was a design deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment."

Enforcement. 10 CFR 50 Appendix B, Criterion III, Design Control, requires, in part, that design control measures be established and implemented to assure that applicable regulatory requirements and the design basis for structures, systems, and components (SSCs) are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, from initial plant operation until March 29, 2007, FPL did not ensure that the RWST level uncertainty analysis and resultant level alarm setpoints adequately maintained the design basis RWST inventory. Because this issue is of very low safety significance, and it was entered into the CAP (CR 07-04915), this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000443/2007006-01, Inadequate RWST Level Uncertainty Analysis)**

.2.1.2 Steam Admission Valve to the Turbine Driven Emergency Feedwater Pump (MS-V-395)

a. Inspection Scope

The team inspected air-operated valve (AOV) MS-V-395 to verify its ability to meet the design basis requirements in response to transient and accident events, including admitting steam to the turbine driven emergency feedwater pump (TDEFWP). The team evaluated accumulator volume calculations to ensure that sufficient air would be provided to hold the valve closed for 31 seconds to prevent moisture to the TDEFWP under design basis conditions. The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed completed tests intended to demonstrate component operability. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of the MS-V-395 valve by sampling corrective action reports, the system health report, operating procedures, and surveillance test (ST) procedures and results. The team reviewed the emergency feedwater (EFW) Design Basis Document (DBD) and Design Request 87-212, EFW Pump Steam Supply Time Delay, to determine the required stroke time for the MS-V-395 valve. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the valve and its support systems and to ensure adequate configuration control.

b. Findings

Introduction: The team identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XI, Test Control, associated with FPL's failure to correctly specify the minimum MS-V-395 stroke time acceptance limits to ensure that the system's design basis requirements could be met.

Description: Teledyne Engineering Services performed a stroke time analysis for the TDEFWP's steam admission AOV (MS-V-395) after water hammer problems were discovered during system testing. The MS-V-395 valve was designed to stroke between 5-15 seconds. The basis for the valve's required minimum and maximum stroke time was part of a sequential timed opening after MS-V-393 and MS-V-394, to allow accumulated condensate to discharge and to allow the TDEFWP turbine governor to match a rapid steam demand, respectively.

The team determined that engineering tested MS-V-395 to meet the requirements of the ASME Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code) and TS 4.0.5. However, the team identified that the implementing procedure did not test the opening stroke time of MS-V-395 to meet the design bases requirements. Specifically, the inservice test (IST) procedure established acceptance criteria allowing the MS-V-395 valve to stroke as early as 4 seconds, instead of the required 5 seconds. The team reviewed recent MS-V-395 IST stroke times and determined that the B electrical train stroke time test did not meet the design basis stroke time of 5 seconds, and had been stroking between 4 and 5 seconds since June 2006. The team noted that operations satisfactorily completed the most recent TDEFWP test in February 2007, and determined that the faster opening time of the valve did not result in a loss of TDEFW system function.

Following identification of the MS-V-395 valve stroke time deficiency, FPL initiated CR 07-04990, declared the TDEFWP inoperable, entered the applicable TS

(TS 3.7.1.2b), and restored the valve stroke time to within its design basis range on April 5, 2007. Engineering determined that inattention to detail caused the IST program document error on June 14, 1989.

Analysis: The performance deficiency associated with this finding was that FPL did not establish an MS-V-395 valve stroke time test acceptance criteria that ensured that the valve would be capable of providing the required design basis stroke time during accident conditions. The issue was reasonably within FPL's ability to foresee and correct prior to April 2007. The team determined that the issue was more than minor because it was similar to Example 2.a in NRC IMC 0612 Appendix E, Examples of Minor Issues. Specifically, the B train MS-V-395 valve stroke time test records indicated that the TS IST limits were exceeded. In addition, this finding is associated with the procedural quality attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the TDEFWP to respond to initiating events to prevent undesirable consequences. The team reviewed this finding using the Phase 1 SDP worksheet and determined the finding was of very low safety significance (Green), because it did not result in the loss of a safety function.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XI, Test Control, states in part that a test program shall be established to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service is identified and performed in accordance with written test procedures that incorporate the requirements and acceptance limits contained in applicable design documents. Contrary to the above, from June 14, 1989, to April 5, 2007, FPL did not include acceptance limits in the TDEFWP steam admission valve STs that were based on design basis requirements. Because this issue was of very low safety significance, and it was entered into FPL's CAP (CR 07-04990), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000443/2007006-02, Non-Conservative TDEFWP Steam Admission Valve Stroke Time Test Acceptance Criteria)**

.2.1.3 4kV Bus Degraded Voltage Relays

a. Inspection Scope

The 4.16kV bus degraded voltage relays function to ensure that adequate voltage levels are available to safety-related alternating current (AC) loads. In addition, the relay reset setpoint must be optimized to prevent a spurious loss-of-offsite power (LOOP). The team reviewed the degraded voltage relay setpoint and uncertainty calculations, calibration test acceptance criteria, relay calibration test results, and station voltage regulation studies (i.e., load drop calculations) to verify that the degraded voltage relays would function as designed during accident and transient conditions and satisfied TS requirements.

b. Findings

No findings of significance were identified.

.2.1.4 Service Water Cooling Tower Fan 2SW-FN-51B

a. Inspection Scope

The service water (SW) cooling tower is the safety-related ultimate heat sink for a postulated loss of SW intake structure event. The tower is a mechanical draft structure, which relies on forced air flow. Fan 2SW-FN-51B is located on the tower roof, has 12 foot fan blades, driven by a 250 horse power motor, and is directly exposed to the weather.

The team reviewed the cooling tower fan design basis, operating limits, engineering analysis, and ST results to verify that the fan would function as designed during accident and transient conditions and satisfied TS requirements. The review included fan motor ratings, load drop calculations, breaker settings and coordination, fan shaft torque ratings, and operating history as documented in ST results, condition reports (CRs), and system health reports. In addition, the team performed detailed walkdowns of the fan and interviewed personnel with fan blade de-icing experience, and reviewed winter cooling tower operating parameters to identify the likelihood of whether adverse winter weather could result in significant ice build-up on the fan blades. The team also walked down accessible portions of the cooling tower to assess material condition, and directly observed cooling tower operation on April 19, 2007.

b. Findings

No findings of significance were identified.

.2.1.5 1E 4kV to 480V Transformer EDE-X-5B

a. Inspection Scope

Transformer EDE-X-5B supplies power to engineered safety feature low voltage buses. The team reviewed calculations, drawings, maintenance procedures, and vendor data to verify that EDE-X-5B was adequately designed and maintained. Specifically, the team reviewed load flow calculations to ensure that the voltage at the loads was supplied within the specified ratings. The team reviewed the design of protective relaying for this transformer to ensure that equipment was properly protected, and immune to spurious tripping under expected transient and steady state loading conditions. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the accessible portions of the transformer and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.6 Primary Component Cooling Water Heat Exchanger Outlet Temperature Control Valve 1-CC-TV-2171-1

a. Inspection Scope

The team inspected air operated valve (AOV) 1-CC-TV-2171-1 to verify its ability to meet the design basis requirements in response to transient and accident events, including throttling for primary component cooling water (PCCW) temperature control. The team evaluated nitrogen backup bottle volume calculations to ensure that sufficient nitrogen would be provided to throttle the valve as required under design basis conditions. The team verified that instrument setpoints were properly translated into system procedures and tests, and reviewed completed tests intended to demonstrate component operability. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of the 1-CC-TV-2171-1 valve by sampling corrective action reports, the system health report, and operating and ST procedures. The team also conducted a detailed walkdown to visually inspect the physical/material condition of the valve and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.7 Residual Heat Removal Valve 1-RH-V-35 (“Piggy-back” Valve)

a. Inspection Scope

Valve 1-RH-V-35 is normally closed during plant operation and opened in certain loss-of-coolant accident (LOCA) scenarios as part of the swap-over from the injection phase to the recirculation phase. The team verified that FPL’s analysis and testing of the valve supported this function. The team reviewed calculations to assure that engineering had adequately evaluated the potential for pressure locking and thermal binding. The team reviewed the valve’s motor operator capacity to assure that sufficient margin was available to open the valve during accident conditions. The team discussed valve performance and corrective actions with the valve engineer and systems engineer. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the valve and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.8 ‘A’ Supplemental Emergency Power System Diesel Generator (1-SEPS-DG-2-A)

a. Inspection Scope

The team reviewed calculations and drawings to determine if the size of the A supplemental emergency power system (SEPS) DG was within equipment ratings. The team reviewed the adequacy and appropriateness of design assumptions and calculations related to the SEPS protection and relay coordination. The team reviewed design calculations to ensure fuel tank capacities were sufficient to meet required fuel oil consumption rates and to ensure vortexing would not occur in the fuel oil tanks. The team verified that tank capacity tests demonstrated the design basis required capacity. The team verified that an appropriate fuel oil chemical control program was in place, such as moisture and impurity controls, to ensure that FPL adequately maintained fuel oil quality. The team performed a review of system normal operating and ST procedures to ensure that component operation and alignments were consistent with design and licensing bases assumptions. The team conducted several walkdowns of the SEPS DGs, observed a SEPS surveillance test, and reviewed additional ST results to assess system operation, configuration control, and material condition. The team reviewed calculations, system health reports, associated instrumentation and setpoints, and SEPS-related corrective action CRs to verify that FPL operated and maintained SEPS within its design basis. Finally, the team discussed the design, operation and maintenance of SEPS and related equipment with design and system engineers and plant operators.

b. Findings

No findings of significance were identified.

.2.1.9 Turbine Driven Emergency Feed Pump (FW-P-37)

a. Inspection Scope

The team reviewed the design of the TDEFWP. This review included the system flow calculations related to the pump operation under various transient and accident conditions and interactions between pumps under minimum flow conditions. The team reviewed the results of recent pump surveillance tests, ST acceptance criteria, corrective action CRs, system health reports, engineering evaluations, and responses to related industry operating experience (OE). The team also conducted several detailed walkdowns to assess the material condition of the pump and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.10 Start-up Feedwater Pump (1-FW-P-113)

a. Inspection Scope

The start-up feedwater (SUFW) pump is a non-safety related pump; however, it provides a back-up source of water for the EFW system. The team reviewed the SUFW vendor manual, test results, system drawings, and associated flow calculations to verify that the pump could provide the back-up function as designed. The team discussed system operating experience (suction header air intrusion, in particular) and corrective actions with design engineering. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the pump and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.11 'B' Train Emergency Diesel Generator (1-DG-DG-1-B)

a. Inspection Scope

The team reviewed three sub-components of the B emergency diesel generator (EDG) to assess whether the EDG would function as required during normal and accident conditions. The three EDG systems inspected were the diesel fuel oil system, lube oil system, and starting air. The fuel oil system was reviewed to ensure a sufficient supply of fuel oil would be available and the system would function as designed; the lube oil system was reviewed to ensure the system would provide a continuous supply of oil to components of the EDG; and the starting air system was inspected to ensure the system would supply sufficient compressed air to initiate an engine start. The team reviewed calculations, hydraulic analyses, system health reports, associated instrumentation and setpoints, and corrective action CRs to verify that FPL operated the EDG within its design basis. The team reviewed ST results to verify levels and temperatures were within acceptable limits; and reviewed operating and test procedures to assess whether component operation and alignments were consistent with design and licensing basis assumptions. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the EDG and its support systems and to ensure adequate configuration control. Finally, the team discussed the design, operation and maintenance of the EDG and related equipment with design and system engineers and plant operators.

b. Findings

No findings of significance were identified.

.2.1.12 'B' 125Vdc Battery (EDEB-1B)

a. Inspection Scope

The team reviewed the battery load and margin, charger sizing calculations, battery float and equalizing voltages, overall battery capacity, performance discharge test, short circuit calculation, and breaker interrupting ratings and electrical coordination to verify that the battery would function as designed during accident and transient conditions. The team reviewed electrical schematics for selected 10 CFR Part 50 Appendix R circuits to ensure that coordination existed between the downstream and the upstream fuses. In addition, the team conducted several detailed walkdowns to visually inspect the physical/material condition of the battery and confirm that the battery room temperatures were within specified design temperature ranges. During the walkdowns, the team visually inspected the battery for signs of degradation such as excessive terminal corrosion and electrolyte leaks. The team also reviewed battery ST results to verify that battery condition and test acceptance criteria satisfied applicable TS requirements.

b. Findings

No findings of significance were identified.

.2.1.13 Service Water Secondary Isolation Valve (SW-V-5)

a. Inspection Scope

The SW isolation valves have a safety function to close on receipt of a tower actuation, safety injection (SI), or LOOP signal to isolate the SW supply to turbine building loads that are not necessary for safe shutdown. The team selected SW-V-5 as a representative sample of the two installed SW secondary isolation valves. The team reviewed valve design calculations, inservice test (IST) results, valve diagnostic testing procedures, engineering evaluations, system health reports, and disposition of CRs related to the valve. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the valve and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.14 1E 480V Motor Control Center E621

a. Inspection Scope

The team reviewed calculations and drawings to determine if the size of 480V motor control center (MCC) E621 was within equipment ratings. The team reviewed the adequacy and appropriateness of design assumptions and calculations related to in-feed transformer protection and relay coordination. On a sampling basis, the team reviewed maintenance and test procedures, including acceptance criteria, to verify that MCC E621 was capable of supplying power necessary to ensure proper operation of connected equipment during normal and accident conditions.

b. Findings

No findings of significance were identified.

.2.1.15 Containment Sump Suction Motor-Operated Valve 1-CBS-V-14

a. Inspection Scope

The containment sump isolation valves have a safety function to open to start the recirculation phase during the recovery from a LOCA. The team selected 1-CBS-V-14 as a representative sample of the two installed containment sump isolation valves. The team reviewed valve design calculations, IST results, valve diagnostic testing procedures, engineering evaluations, and disposition of CRs related to the valve. The team performed walkdowns of the valve encapsulation, containment, sump debris interceptors, and the containment sump strainer to assess material condition and design control.

b. Findings

No findings of significance were identified.

.2.1.16 Primary Component Cooling Water Head Tank 1-CC-TK-19B

a. Inspection Scope

The team reviewed the B train PCCW head tank to assure that it would be capable of providing adequate suction pressure for the B PCCW pump given the postulated leak in the PCCW system. The team reviewed the head tank capacity analysis to determine if the tank had adequate volume to accommodate system thermal transients. The team reviewed Seabrook engineering's response to NRC Information Notice (IN) 98-25, associated operating procedures, and supporting drawings to assess the availability and qualification of the back-up supply of water for the head tank. The team discussed system operating experience and corrective actions with the PCCW system engineer. The team also conducted several detailed walkdowns to visually inspect the physical/material condition of the tank and its support systems and to ensure adequate configuration control.

b. Findings

No findings of significance were identified.

.2.1.17 Train B Emergency Power Sequencer

a. Inspection Scope

The emergency power sequencer (EPS) has a safety function to provide appropriate contact outputs to the various safety-related loads to start them in a programmed time sequence. The team reviewed drawings, logic diagrams, maintenance and test procedures, and vendor manuals to verify that the EPS would function as designed during accident and transient conditions. The team reviewed the adequacy and appropriateness of design assumptions and calculations related to the load sequencer to assure proper operation.

b. Findings

No findings of significance were identified.

.2.2 Review of Low Margin Operator Actions (4 samples)

The team performed a margin assessment of expected operator actions, and selected a sample of operator actions for detailed review based upon risk significance, time dependency of the actions, and factors affecting the likelihood of human error. The operator actions were selected from PRA rankings of human action importance based on risk reduction worth (RRW) values and other PRA insights.

Considerations in the selection process included the following factors:

- Environmental conditions or restrictions for performing the actions;
- Personnel access to equipment;
- Plant procedures that address the actions;
- Need for additional personnel or equipment;
- Information available for diagnosing conditions and initiating actions;
- Ability of operator to recover from errors while performing task;
- Consequences of failure to complete action;
- Time to complete actions; and
- Task included in the Systematic Approach to Training (SAT) based training program and trained on.

The selected operator actions were generally characterized as having one or more of the following attributes:

- Low margin between the time required and time available to perform the actions;
- Reliability or redundancy of the components associated with the actions;
- Complexity of the actions; and
- Procedure or training challenges that increase the likelihood of an operator error.

.2.2.1 Operator Response to Loss of One Train of Primary Component Cooling Water

a. Inspection Scope

The team selected the manual operator actions for a loss of one train of PCCW. Specifically, the actions reviewed were to reduce or isolate reactor letdown flow to the volume control tank and start a charging pump in the opposite equipment train, following a loss of one train of PCCW. These manual operator actions were identified in FPL's PRA as risk significant based on the risk importance of reactor coolant pump (RCP) seal integrity. FPL expected the operators to trip the two affected RCPs within ten minutes and control letdown and charging flows to maintain seal injection flow to all four RCPs. The team selected this sample because these risk significant, time critical manual actions appeared to have low margin between the time required and the time available to perform the actions.

The team reviewed the mechanical, control, and instrumentation design for selected portions of PCCW, the chemical and volume control system, and the RCP seal cooling systems to assess component performance and design and operating limits during a loss of PCCW event. This review included operating assumptions, calculations, and system boundary conditions. The team evaluated the available process margins, based on fluid flow rates, temperatures, and heat transfer capacities; and performed limited independent calculations and analyses in several areas to verify the reasonableness of the design and operating values.

The team observed an operating crew respond to a loss of the A train of PCCW in the Seabrook simulator; interviewed licensed operators; and reviewed normal, abnormal, emergency operating procedures (EOPs), and alarm response procedures to evaluate the time margins to perform the manual actions. In addition, the team performed main control room walkdowns to independently identify operator task complexity. The team compared the available time, based on the identified equipment and operating limits, against the observed operator simulator performance and expected operator response based on nominal procedure usage demonstrated during licensed operator training. The team evaluated those time margins to verify the reasonableness of FPL's operating and risk assumptions.

b. Findings

No findings of significance were identified.

.2.2.2 Operator Response to a Service Water Pump Failure to Restart in a LOOP Event

a. Inspection Scope

The team selected the manual operator action to start a SW pump during a LOOP scenario, following a failure of the previously running SW pump to restart. By design, during a LOOP event, each EDG will automatically start, re-energize the associated 4kV emergency bus, and sequentially start the safety loads on that electrical bus, including the associated SW pump for that equipment train. If the associated SW pump failed to automatically restart, then the operating EDG would trip due to high jacket water or lube oil temperature within a short time period. The team selected this sample because this risk significant, time critical manual action appeared to have low margin between the time required and the time available to perform the actions.

The team reviewed the control and instrumentation design, and hydraulic model for selected portions of the EDG and SW systems to assess component performance and design and operating limits during a loss of SW cooling event. This review included operating assumptions, calculations, and projected EDG cooling system performance and heat-up rates. The team evaluated the available process margins, based on fluid flow rates and cooling loop volumes, temperatures, and heat transfer capacities to verify the reasonableness of the design and operating values, and time margins. Seabrook engineering determined the time available to restart a SW pump was about 17 minutes.

The team observed an operating crew respond to a LOOP with a coincident failure to automatically restart a SW pump in the Seabrook simulator; interviewed licensed operators; and reviewed normal, abnormal, and EOPs to evaluate the time required to perform the manual actions. The team compared the available time against the time required to perform the manual actions to verify the reasonableness of FPL's operating and risk assumptions.

b. Findings

No findings of significance were identified.

.2.2.3 Energize Vital Buses from the Supplemental Emergency Power System during a Station Blackout

a. Inspection Scope

The team selected the manual operator actions to energize emergency bus E5 or E6 from the SEPS during a Station Blackout (SBO) event. The actions reviewed included:

- Manual start attempt of the EDGs;
- Inhibit large loads from automatically starting;
- Isolate charging pumps before the Westinghouse time limit to prevent a RCP seal LOCA when charging is restored;
- Align SEPS to either Bus 5 or Bus 6;
- Manually sequence loads onto the vital bus; and
- Control bus loads to avoid over-loading the SEPS.

The team reviewed normal and emergency procedures and bases documents to evaluate the time required to perform the actions. The team reviewed FPL's SBO analysis, design basis documents (DBD's), and design calculations to evaluate the available operating limits and design margins. The team performed walkdowns of the SEPS diesels to identify operator task complexity and verify procedure adequacy. In addition, the team interviewed Seabrook operators to evaluate the time required to perform the manual actions. The team compared the available time against the time required to perform the manual actions to verify whether the implemented operator actions would be consistent with design, licensing, and PRA assumptions.

b. Findings

No findings of significance were identified.

.2.2.4 Transfer to Cold Leg Recirculation

a. Inspection Scope

The team selected the operator actions required to transfer the emergency core cooling system (ECCS) from the injection phase to the cold leg recirculation phase during a LOCA. By design, within three minutes of receipt of the RWST Lo-Lo level alarm, the containment sump isolation valves will automatically open and the operator must then take manual actions to shut the RWST suction valves placing the residual heat removal (RHR) system into cold leg recirculation. Failure to accomplish these actions could cause air ingestion by vortexing into all of the ECCS pump suctions, potentially damaging the pumps. The operator then has an additional five minutes after shutting the RWST suction valves to complete the transfer of suctions from the RWST to the containment sump for the remainder of the ECCS pumps. The team selected this sample because this risk significant, time critical operator action appeared to have low margin between the time required and the time available to perform the actions.

The team reviewed the RWST level detection system accuracy and tolerances, system design calculations pertaining to vortexing, design parameters for the associated motor operated valves (MOVs), and applicable Emergency Operating Procedures (EOP's). The team evaluated the available margin based on fluid flow rates, instrument accuracies, operator and engineer interviews, and the vortexing calculation of record to verify the reasonableness of the design and operating values.

b. Findings

No findings of significance were identified.

.3 Review of Industry Operating Experience and Generic Issues (5 samples)

a. Inspection Scope

The team reviewed selected OE issues that had occurred at domestic and foreign nuclear facilities for applicability at Seabrook. The team performed an independent applicability review and selected issues with apparent applicability to Seabrook. The team performed a detailed review of the OE issues listed below to verify that FPL had appropriately assessed potential applicabililty to site equipment and implemented corrective actions as required.

- <u>Operating Experience Smart Sample FY2007-02</u>

  NRC Operating Experience Smart Sample (OpESS) FY2007-02 is related to NRC IN 2005-30, Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design, and issues associated with conduit/hydrostatic seal issues. The team evaluated internal flood protection measures for the 4kV essential switchgear rooms, fuel oil transfer pump rooms, EFW pump room, and RHR equipment vaults. The team walked down the areas to assess operational readiness of various features in place to protect redundant safety-related components and vital electric power systems from internal flooding. These features included equipment drains, flood detection, flood barrier curbs, and wall penetration seals. The team conducted a detailed walkdown of the turbine, EFW, EDG, and primary auxiliary buildings with a design engineer to assess potential internal flood vulnerabilities. The team also reviewed engineering evaluations, alarm response procedures, preventive and corrective maintenance history, operator training, and corrective action CRs associated with flood protection equipment and measures. Finally, the team interviewed Seabrook personnel regarding their knowledge of indications, procedures and required actions during a postulated turbine building piping rupture.

- <u>NRC Information Notice 2002-12: Submerged Safety-Related Electrical Cables</u>

  The team reviewed the applicability and disposition of electrical cable degradation concerns described in NRC IN 2002-12, Submerged Safety-related Electrical Cables. The basis of IN 2002-12 was a concern that a potential common mode failure of underground cables could affect the operability of accident mitigation systems. The team reviewed the potential consequences of operating with submerged power cables. The team reviewed FPL's associated engineering evaluations, cable specifications, cabling monitoring and testing to ensure that permanent plant cables were appropriately qualified for submergence, as applicable. The team also reviewed potential adverse impact to the cable support structures due to water submergence.

- <u>NRC Information Notice 2006-22: New Ultra-Low-Sulfur Diesel Fuel Oil Could Adversely Impact Diesel Engine Performance</u>

  The team reviewed FPL's assessment of the potential impact on EDG operation with the use of the new ultra low sulfur fuel. The team reviewed fuel receipt forms, fuel oil sampling results, technical evaluations, and FPL's assessment of the potential impact on the EDGs. The team also reviewed a sample of corrective action CRs associated with EDG issues to verify that the problems identified in IN 06-22 had not occurred.

- Safety Injection System Gas Intrusion

  The team reviewed the applicability and disposition of various industry OE related to the potential for gas intrusion into Seabrook's SI system. The team reviewed Seabrook engineering's response to related industry OE, ECCS health reports, system venting and ultrasonic test (UT) procedures and practices, and established limits and controls. The team also discussed FPL's mitigation activities and trending with the system and non-destructive examination (NDE) engineers.

- NRC Information Notice 2006-29: Potential Common Cause Failure of Motor-Operated Valves as a result of Stem Nut Wear

  The team reviewed FPL's response to the OE presented in NRC IN 2006-29 regarding MOV stem nut wear. The team reviewed changes that FPL made in the MOV diagnostic procedures for MOVs to detect excessive stem nut wear. The team also interviewed the MOV system engineer concerning the results and effectiveness of the modified diagnostic procedures.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On April 26, 2007, the team presented the inspection results to Mr. G. St. Pierre and other members of Seabrook Station management. The team verified that no proprietary information is documented in the report.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

R. Belanger	Design Engineering
P. Brown	MOV/AOV System Engineer
R. Cliche	Manager, Design Engineering
S. Fournier	Design Engineering
R. Jamison	Design Engineering
J. Johnson	EFW System Engineer
D. Kelly	EOP Coordinator
A. Kodal	PCCW System Engineer
R. McCormack	SW System Engineer
D. McGonigle	Design Engineering
M. O'Keefe	Regulatory Compliance Supervisor
R. Parry	Supervisor, Component Group, Plant Engineering
L. Rau	Supervisor, PRA Engineering
V. Robertson	Regulatory Compliance
T. Schulz	Design Engineering
G. Sessler	SEPS System Engineer
G. St. Pierre	Site Vice President

NRC Personnel:

C. Cahill	Senior Reactor Analyst
G. Dentel	Senior Resident Inspector
S. Shaffer	Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

05000443/2007006-01	NCV	Inadequate RWST level uncertainty analysis. (Section 1R21.2.1.1)
05000443/2007006-02	NCV	Non-conservative TDEFWP steam admission valve stroke time test acceptance criteria. (Section 1R21.2.1.2)

LIST OF DOCUMENTS REVIEWED

Audits and Self-Assessments
07-0011, Component Design Basis Inspection Readiness, dated 1/26/07

Calculations
4.3.05.18F, RWST Transient Temperature Analysis, Rev. 0
4.3.05.27F, RWST Building Temperature, Rev. 3
4.3.05.30F, CBS System Setpoints, Rev. 9
4.3.05.31F, RWST Vortex Studies, Rev. 3
4.3.05.35F, RWST Thermal Growth of Nozzles, Rev. 2
4.3.05.43F, RWST Cooldown, Rev. 0
4.3.07.12F, PCCW Head Tank Overflow Vent and Pump Suction Line Sizes and Pump NPSH Analysis, Rev. 4
4.3.07.27F, PCCW Temperature Control and Alarms, Rev. 7
4.3.5 F12, Containment Spray System, RWST Required Dike Height, Rev. 1
59988 Proto-power #07-014, Seabrook Nuclear Power Plant Tank Vortexing Analysis, Rev. A
737-23, Calculation for SUFP NPSH, Rev. 0
737-60, EFW Pump Recirc Pressure Drop, Rev. 0
760-13, EDG Fuel Oil Transfer Pump NPSH, Rev. 0
9763-05-SP-00-04-F-CALC, PCCW Backup Air Supply, Rev. 0
9763-3-ED-00-01-F, Calculation of Short Circuit Currents, Rev. 7
9763-3-ED-00-02-F, Seabrook Substation 345 kV Voltage Analysis, Rev. 7
9763-3-ED-00-03-F, Cable Application Criteria and Sizing, Rev. 6
9763-3-ED-00-04-F, Grounding Resistor and Transformer Sizing, Rev. 3
9763-3-ED-00-07-F, Rating Determination Step Up Transformer, Rev. 1
9763-3-ED-00-09-F, Minimum Unit Substation Transformer Reactance, Rev. 2
9763-3-ED-00-10-F, Isolated Phase Bus and Generator Circuit Breaker, Rev. 0
9763-3-ED-00-12-F, Generator Breaker Fault Duty, Rev. 2
9763-3-ED-00-14-F, Battery Sizing, Rev. 12
9763-3-ED-00-20-F, Non 1E UPS Loading, Rev. 10
9763-3-ED-00-23-F, Medium Voltage Protective Relay Coordination and Miscellaneous Relay Settings, Rev. 5
9763-3-ED-00-26-F, Fault Duty on 25kV Isolated Phase Bus, Rev. 1
9763-3-ED-00-27-F, Unit Substation Load Study, Rev. 8
9763-3-ED-00-31-F, 480V Coordination, Rev. 3
9763-3-ED-00-32-F, Diesel Generator Relay Setting, Rev. 5
9763-3-ED-00-34-F, UPS Non 1E Loading, Rev. 6
9763-3-ED-00-36-F, Feeder Breaker Coordination During Submergence, Rev. 2
9763-3-ED-00-37-F, Dual Protection F/R-Level Penetration Conductor, Rev. 3
9763-3-ED-00-43-F, DC Short Circuit Calculation, Rev. 3
9763-3-ED-00-44-F, 125VDC Breaker Coordination, Rev. 2
9763-3-ED-00-46-F, Failure of non Class 1E loads on Class 1E Buses, Rev. 3
9763-3-ED-00-66-F, Control Circuit Voltage Drop, Rev. 3
9763-3-ED-00-68-F, 120 VAC Breaker Coordination, Rev. 2
9763-3-ED-00-70-F, Appendix R Fuse Coordination, Rev. 2
9763-3-ED-00-83-F, Diesel Generator Loading, Rev. 7

9763-5-SP-1F, Loop Error Analysis, Rev. 0
C-A-1-E-0130, RWST Time to Vortex, Rev. 2
CN-PME-05-5, Seabrook Model 93A-1 RCP Internal Water Volume, Rev. 0
C-S-1-20801, EFW System Flow Study, Rev. 1
C-S-1-23704, Allowable Leakage from Safety Related Air Supplies, Rev. 2
C-S-1-23903, Maximum Void Size in RHR Pump Suction Piping, Rev. 0
C-S-1-25107, DG Control Air Usage / Air Compressor Capacity, Rev. 3
C-S-1-28009, PCCW Heat Loads and Flow Rates for Various Plant Operating Modes After SPU, Rev. 0
C-S-1-28020, Post LOCA Calculations, Rev. 0
C-S-1-57002-CALC, Electrical Distribution System Instrument Uncertainties, Rev. 2
C-S-1-80903, Max DP and Line Pressures, Rev. 0
C-S-1-80904, Valve Sizing Calculation, Rev. 23
C-S-1-83813, RWST Minimum Level for Centrifugal Charging Pump Operation, Rev. 3
C-S-1-84104, Maximum Void Size in Charging and SI Pump Suction Piping, Rev. 3
C-S-1-91006, Adequacy of 1-MS-TK-243 Air Capacity for 1-MS-V-395, Rev. 0
C-S-1-E-0130, RWST Time to Vortex, Rev. 2
C-S-1-E-0161, EDG Maximum Allowable Fuel Oil Consumption Rate, Rev. 13
C-S-20805, EFW Pump Pressure at Overspeed Trip, Rev. 1
C-X-1-21802, Expansion Joint Rupture in the Circulating System located in the Turbine Building, Rev. 2
C-X-1-50004, Air Accumulators Sizing (1-DG-MM-202A, B), Rev.1
FPS1058-04, PCCW Surge Tank Stress and ASME Code Report, dated 10/10/79
SBC-128, Technical Specifications - Setpoints & Allowable Values, Rev. 14
SBC-227, DC System Evaluation For Station Blackout, Rev. 2
SBC-565, Diesel Generator Fuel Oil Tank Vortexing Evaluation, Rev. 0

Completed Surveillance Test Procedures
1-MS-V-395, FlowScanner Valve Diagnostic Test Results, dated 4/2/05 and 11/17/00
CCTV-2171-1, FlowScanner Valve Diagnostic Test Results, dated 10/16/03 and 11/13/00
DG B Checklist/Operations Log, Monthly Run, dated 3/27/07 - 3/30/07
EX1804.023, Diesel Generator Fuel Oil Transfer Pumps Flow Verification 18 Month Surveillance, dated 9/25/06
LX0556.02, Weekly Technical Specification Battery Surveillance, dated 2/17/07, 2/24/07, 3/3/07 and 3/11/07
LX0556.03, Quarterly Technical Specification Battery Surveillance, dated 6/23/06, 8/21/06 and 11/16/06
LX0556.04, Station Battery Service Test, dated 11/8/04 and 3/24/06
LX0556.05, Station Battery Performance Discharge Test, dated 8/1/01
LX0556.10, 18 Month Technical Specification Battery Surveillance (A), dated 2/26/04 & 3/21/07
LX0556.10, 18 Month Technical Specification Battery Surveillance (B), dated 11/17/04 & 5/31/06
LX0556.10, 18 Month Technical Specification Battery Surveillance (C), dated 10/6/04 & 2/25/06
LX0556.10, 18 Month Technical Specification Battery Surveillance (D), dated 10/22/04 & 7/26/06
OS1015.18 Form A, Containment Closeout Checklist, dated 10/29/06
OS1412.11, PCCW CC-TV2171-1 Stroke Time Test, dated 11/2/06, 4/18/05, and 10/23/03

OX1412.05, Monthly PCCW Loop A Valve Verification, dated 3/18/07
OX1412.06, Monthly PCCW Loop B Valve Verification, dated 4/2/07
OX1416.01, Monthly Service Water Valve Verification, dated 3/16/07
OX1416.03, Monthly Cooling Tower Fan Operability Test, dated 10/18/02 - 3/1/07
OX1426.14, Diesel Generator Air Start System Valves Quarterly Test, dated 1/31/07
OX1426.20, Diesel Generator 1A 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance, dated 10/29/06
OX1426.21, Diesel Generator 1B 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance, dated 10/29/06
OX1426.25, Diesel Generator Cooling Water and Air Start System Valves Surveillance, dated 11/9/05
OX1436.02, Turbine Driven Emergency Feedwater Pump Quarterly and Monthly Valve Alignment, dated 1/2/07, 10/10/06, and 6/9/06
OX1456.50, Train B ESFAS Slave RelayK616 Quarterly Block / Go Test, dated 4/6/07
OX1461.01, SEPS Full Load Testing Surveillance, dated 1/6/07
OX1461.04, SEPS Monthly Availability Surveillance, dated 4/18/07, 3/20/07, and 2/19/07
OX1461.05, SEPS Annual Availability Surveillance, dated 4/1/07

Condition Reports

97-15212	04-04780	05-06940	06-13900	07-04573*
00-01826	04-05680	05-07885	06-13937	07-04637*
00-05238	04-10301	05-08665	06-14413	07-04640*
00-06389	04-10703	05-08673	06-14893	07-04809*
00-14131	04-10772	05-08907	06-14980	07-04812*
01-00570	04-10997	05-10554	06-15499	07-04915*
01-02356	04-11233	05-11758	07-00051	07-04962*
01-05088	04-11469	05-12011	07-00635	07-04990*
01-09430	04-11820	05-12652	07-00636	07-04995*
02-02145	05-00460	05-13021	07-00721	07-05148*
02-04904	05-01436	05-13283	07-00887	07-05190
02-12069	05-02686	06-00954	07-00943	07-05226*
02-15944	05-03714	06-01031	07-00944	07-05270*
03-00147	05-03757	06-01087	07-00945	07-05333*
03-00789	05-03847	06-01826	07-00946	07-05487*
03-01082	05-04016	06-03686	07-01098	07-05488*
03-01554	05-04433	06-03866	07-01183	07-05491*
03-01871	05-04542	06-04860	07-03432	07-05583*
03-02660	05-05108	06-05141	07-03489	07-05611*
03-02826	05-05324	06-06792	07-03504	07-05623
03-05411	05-05325	06-08864	07-03741	07-05629*
03-07694	05-05336	06-08888	07-04010	07-05632*
04-00958	05-05813	06-08929	07-04044	07-05665*
04-02508	05-05900	06-09133	07-04096	07-05668*
04-02862	05-05906	06-12457	07-04127*	07-05672*
04-03897	05-05942	06-12598	07-04207*	07-05720*
04-04167	05-06633	06-12604	07-04320*	07-05730*
04-04540	05-06669	06-13535	07-04427	07-05800*

07-05854*	07-05937*	07-05939*	07-06453*
07-05933*	07-05938*	07-05952*	

* NRC identified during this inspection

Design & Licensing Bases
DBD-CC-01, Primary Component Cooling Water System, Rev. 3
DBD-DG-01, Emergency Diesel Generator - Mechanical, Rev. 4
DBD-EFW-01, Emergency Feedwater System, Rev. 5
DBD-RH-01, Residual Heat Removal System, Rev. 1
DBD-SW-01, Service Water System, Rev. 4
L-2005-034, FPL Response to NRC Generic Letter 2004-02 for Seabrook Station, dated 3/4/05
L-2005-181, FPL Second Response to NRC Generic Letter 2004-02 for Seabrook Station, dated 9/1/05
L-2006-028, FPL Supplemental Response to NRC Generic Letter 2004-02 for Seabrook Station, dated 1/27/06
NYN-90003, NHY Letter: Response to Generic Letter 89-10, dated 1/2/90
NYN-92127, North Atlantic Letter to USNRC, dated 10/14/92
NYN-93139, North Atlantic Energy Service Corporation Letter: Response to Generic Letter 89-10 Supplement 5, dated 10/15/93
NYN-95080, North Atlantic Entergy Service Corporation Ltr: Response to Generic Letter 95-07,dated 10/13/95
NYN-96007, North Atlantic Entergy Service Corporation Ltr: 180 Day Response to Generic Letter 95-07, dated 2/13/96
NYN-97030, Seabrook Station 180-Day Response to Generic Letter 96-05, dated 3/18/97
NYN-98001, 90-Day Response to Generic Letter 97-04
NYN-99075, Response to 2nd RAI, GL 95-07, dated 8/11/99
Regulatory Guide 1.137, Fuel-Oil Systems for Standby Diesel Generators, Rev. 1
Regulatory Guide 1.9, Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants, Rev. 4
Seabrook Station Safety Evaluation for Amendment No. 101, Regarding 5.2% Power Uprate, dated 2/28/05
Standard Review Plan 9.5.6, Emergency Diesel Engine Starting System, Rev. 2
TB-04-22, Reactor Coolant Pump Seal Performance - Appendix R Compliance and Loss of All Seal Cooling, Rev. 1
UFCR No. 07-010, UFSAR Change Request - Change to TR 5.1, Diesel Fuel Oil Testing Program for Ultra-Low-Sulfur Fuel, Rev. 0

Drawings
1&2-SW-FN-51A, 400 HP Reliance Motor Data, Rev. 0
12334, Liquid Level Switch (Type IC/RL-I-U), Rev. K
1-CBS-B20233, Containment Spray System
1-CC-B20209, PCCW Thermal Barrier PI&D, Rev. 10
1-CC-B20211, Primary Component Cooling Loop "B" Detail P&ID, Rev. 20
1-CO-B200426, Condensate System Detail, Rev. 28
1-CS-B20725, Chemical & Volume Control - Charging System P&ID, Rev. 25

1-CS-B20726, Chemical & Volume Control - Seal Water P&ID, Rev. 20
1-CS-D20725, Chemical & Volume Control - Charging System Detail, Rev. 24
1-CW-B20673, Circulating Water Detail, Rev. 21
1-CW-B20674, Circulating Water Detail, Rev. 6
1-DG-B20464, Diesel Generator Fuel Oil System Train "B" Detail, Rev. 17
1-DG-B20465, Diesel Generator Starting Air System Train "B" Detail, Rev. 23
1-DF-B20200, Miscellaneous Buildings Floor Drain Sump Pumps, Rev. 13
1-DF-D210965, Plant Drainage Oil/water Separation System 2 Detail, Rev. 6
1-DR-B20633, Roof Drain System Detail, Rev. 7
1-DR-B20634, Roof Drain System Detail, Rev. 10
1-FW-B20685, Emergency Feedwater System Overview
1-FW-B20687, Feed Water System Details, Rev. 24
1-FW-B20688, Emergency Feedwater System Details
1-IA-B20647, Instrument Air Bottle Supply
1-MS-B20582, Main Steam System Emergency Feedwater Pump Supply Detail
1-NHY-250000, Data Sheets for Motor and Air Operated Valves and Dampers, Rev. 60
1-NHY-310002, Unit Electrical Distribution One Line Diagram, Rev. 37
1-NHY-310102 SH A53a, 4160 V Bus 1-E5 PT 3-line Diagram, Rev. 13
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1-NHY-310102 SH A53c, 4160 V Bus 1-E5 PT Switch Development, Rev. 14
1-NHY-310102 SH A53e, 4160 V Bus 1-E5 PTS Schematic, Rev. 10
1-NHY-310102 SH A53f, 4160 V Bus 1-E5 PTS Auxiliary Contacts, Rev. 11
1-NHY-310102 SH A53h, 4160 V Bus 1-E5 PTS Schematic, Rev. 6
1-NHY-310004, 13800V Switchgear Bus 1-1, One Line Diagram, Rev. 16
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1-NHY-310009 Sh. 2, 4160V Switchgear Bus 1-3 and 1-4, One Line Diagram, Rev. 1
1-NHY-310010 Sh. 1, Diesel Generator DG-1A AND DG-1B, One Line Diagram, Rev. 15
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1-NHY-310041, 125VDC and 120VAC Instrument Buses Key One Line Diagram, Rev. 14
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1-NHY-310103, 480 V Bus I-E63PT Three Line Diagram, Rev. 10
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1-NHY-310897, Containment Purge Isolation Valve V-28 Schematic Diagram, Rev. 8
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1-NHY-310928, DG-1B Rm Supply Air Fan 1-FN-25B Schematic Diagram, Rev. 14

1-NHY-310970, Supplemental Emergency Power System 4160V Distribution Schematic Diagram, Rev. 5
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1-NHY-503489, DG - Diesel Engine Common Computer Alarms Logic Diagram, Rev. 10
1-NHY-503492, DG - Diesel Shutdown and Emergency Stop Logic Diagram, Rev. 11
1-NHY-503493, DG - Diesel Shutdown and Start Logic Diagram, Rev. 8
1-NHY-503584, FW-Emerg FD P-37A Steam Supply Vlv (MS-V394) Logic Diagram, Rev. 12
1-NHY-503585, FW-Emerg FD P-37A Steam Supply Vlv (MS-V393) Logic Diagram, Rev. 13
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1-NHY-506199, CC - HX E-17A Loop A Control Loop Diagram, Rev. 17
1-NHY-506392, DG - DG-1B Starting Air System SKD-17B & SKD-142B Control Loop Diagram, Rev. 11
1-NHY-506398, DG - Fuel Oil Transfer Pump P-38B Control Loop Diagram, Rev. 8
1-NHY-506402, DG - 1B Lube Oil System Control Loop Diagram, Rev. 17
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1-NHY-804979, Engineered Safety Features Flow Diagram
1-SW-B-20792, Service Water P&ID, Rev. 5
1-SW-B20795, Service Water System Nuclear Detail
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2480037, STV 8"-16" BLT BT FGD Motor Operator, Rev. 11
34C109843, Start-up Feed Pumps Induction Motor, Rev. 1
600105-2, Cooling Tower Fan Coupling, Rev. 11
615-B Sheets 1-3, Primary Component Cooling Water Head Tank, Rev. 2, 3 and 5
9763-F-414601, Feedwater Piping Erection Isometric 1-FW-4610-5, Rev. 1
9763-F-604061, Turbine Building Floor, Roof & Equipment Drainage Piping Plan, Rev. 19
9763-F-604065, Drainage Piping Details, Rev. 8
9763-F-604100, Electrical Tunnels Upper & Lower Levels Drainage & Fire Protection Piping, Rev. 7
9763-F-604102, Diesel Generator Building Drainage & Fire Protection Piping, Rev. 10
9763-F-604122, PAB Building Fire Protection & Drainage Piping Sections, Rev. 11
9763-F-805370, RHR & Containment Spray Equip. Vaults Floor & Equipment Drains Plans, Rev. 5
D-66HMTA86X27-B, Start-Up Feed Pumps General Arrangement, Rev. 2
Drawing E1 (140840), Refueling Water Storage Tanks, dated 11/6/78
G25159, 12" Type 7620 Valve Limitorque SMB-00-5 H3BC Rotary Actuator, Rev. F
SEPS Fuel System Hand Diagram, dated 4/23/07
SKD-970033-5001, Condenser Pit Level Switches DF-LSH-5984 and DF-LSH-5985 Installation Details, dated 10/3/97
V37817, Reliance AC Motor Performance Data, Rev. 1

<u>Engineering Evaluations</u>
93-022, Air System Operability Requirements, Rev. 1
95-01, Engineering Evaluation: Pressure Locking and Thermal Binding of Gate Valves, Rev. 2
95045476, Air Entrainment in Terry Turbine Lubricating Oil System, dated 1/2/96
97-021 DCN 15, Motor Operated Valve Design Changes, RF05
98-029, Evaluation of NRC Generic Letter 89-10 Motor Operated Butterfly Valve Capability, Rev. 2
99-014, Transfer to Cold Leg Recirculation Timing Criteria, Rev. 2
99-032, Maximum Allowable Gas Bubble Sizes At ECCS High Points, Rev. 0
02MSE046, Alternate Grease for Gear Cases on Class 1E Limitorque MOV Actuators Located in Harsh Environments, Rev. 0
03-016, Risk-Based Prioritization of Motor-Operated Valves in the GL 89-10 Program, Rev. 0
03-017, Risk Based Prioritization of AOVs in 89-10 Program, Rev. 0
04-006, Seabrook Station Power Uprate Project: Emergency Feedwater System, Rev. 1
04-024, Operator Action Response Times Assumed in the UFSAR, Rev. 3
05-010, Emergency Feedwater Pump Surveillance Testing Evaluation, Rev. 0
06-10718, DG Fuel Oil Transfer Pump Relief Valve and Discharge Piping, Rev. 0
CEM# 06-73, Open Operability Determinations, dated 10/27/06
DCR 87-212, EFW Pump Steam Supply Time Delay, Rev. 3
DDR 89-112, T & B Substitution for Panduit Cable Ties for use in Securing Lagging, Rev. 0
ECA 9200048, Substitution of Tefzel Cable Ties for Banding on Lagging, Rev. A & B
ECA-98118030, PCCW TCV's Rendered Inoperable Due to Inadequate Capacity of High Pressure Backup Gas Supply, Rev. C
EE-04-015, Response to NRC-IR2004-003 Apparent Violation: DCR 97-033 10CFR50.59 (Turbine Building Flood Protection), Rev. 0
EE-04-024, Operator Action Response Times Assumed in the UFSAR, Rev. 3
EE-06-038, Evaluation of 1-CC-E-17-A Train A PCCW Heat Exchanger Fouling Event, Rev. 0
EE-98-027, Gas Intrusion Evaluation, Rev. 2
EE-98-07, Pressure Locking and Thermal Binding of Gate Valves, Rev. 2
Engineering Evaluation 90-33, Diesel Generator Fuel Oil Storage Tank Particulate Sampling, dated 7/17/90
Engineering Evaluation 90-50, Internal Flooding Potential Through Plant Drain and Sump Systems, dated 11/30/90
Engineering Evaluation 93-22, Diesel Generator Starting Air System Operability Requirements, dated 11/2/93
Evaluation of Uncertainty Issues associated with RWST Tech Spec Level, dated 4/4/07
FP59556, PCCW Temperature Reduction Evaluation Summary, Rev. 0
MMOD 95-509, CBS Sump Isolation Valve Modifications, Rev. 1
MPR Document 326-003-5B2, Friction Evaluation, Rev. 1
MSE#07MSE059, Additional Temperature Compensation to RWST Level Indication and Alarms, Rev. 0
NCT-673-702, Ceramic Cooling Tower Engineering Report, Rev. 0
RES-93-500, PCCW Affect of a Seismic Event on PCCW Heat Removal Capacity, dated 12/93
SS-EV-980002, Evaluation of ECCS High Points, Rev. 0
SS-EV-980006, IST Pump Surveillance Requirements, Rev. 9
SSPSS-2006, Section-11, Seabrook PRA Human Action Analysis
TP-7, Moderate Energy Line Break Study, Rev. 5

Equipment Specifications

9763-006-137-1, Specification for Storage Batteries, Rev.7
9763-006-137-2, Specification for Battery Chargers, Rev. 6
9763-006-143-1, Specification for 460 Volt Motor Control Centers, Rev. 10
9763-006-145-3, Specification for 480 Volt Unit Substation, Rev. 9
9763-006-201-1, Specification for Emergency Diesel Generator Sets, Rev. 5
9763-006-238-10, Specification for Emergency Feed Pumps, dated 8/21/73
DCR 96-012 DCN-16, Technical Requirements for 24 Inch Perforated Truncated Cone Type Replacement Baskets for Seabrook Station Service Water Strainers, Rev. 1
DWG No. 59285, Main Roof Drain Specification Sheet, Rev. 1
S-X-1-E-0121, Specification for Supplemental Emergency Power System, Rev. 0

Maintenance Rule Documents

CC-01, Maintenance Rule Document - PCCW
EFW-02, Maintenance Rule Document - EFW
Maintenance Rule (a)(1) Action Plan List, 7/03 - Present

Maintenance Work Orders

0219738	0408075	0527586	0608372	0621999
0227185	0408076	0530824	0609032	0622000
0232397	0408082	0532357	0609170	0623084
0244287	0409098	0534279	0609172	0623177
0322264	0409171	0535545	0609174	0623911
0401253	0413746	0535556	0609176	0624542
0402974	0418778	0536522	0609184	0624556
0403002	0442818	0537169	0609186	0625212
0403071	0504986	0537470	0609188	0625452
0403089	0507845	0539200	0609199	0626034
0403740	0514236	0540933	0614884	0626035
0403744	0515716	0542598	0616519	0626584
0403801	0515828	0543944	0617744	0626627
0403880	0516094	0545479	0617749	0627612
0403903	0516098	0600187	0619338	0628997
0406393	0517513	0601631	0619342	0701556
0406394	0517516	0603266	0619358	
0407335	0518451	0604699	0621783	

Miscellaneous

04-004 #06, CVS Inventory Enhancement, Rev. 0
05115108, Request Fabrication Details of Accumulator Tank 1-MS-TK-243 for MS-V-395, Rev. B
1-SEPS-LI-9653-A, SEPS DG-2A Fuel Tank Level Meter Setpoints, Rev. 0
22583-02, Terry Turbine Performance Curve, Rev. 1
24724-01, Performance Curves & Vibration Tests, Rev. 0
3379001-11, Service Bulletin - Fuels for Cummins Engines, 3/20/07
95-407, Flow/Head Data, Rev. 0

Alden 2007-1010, Hydraulic Modeling of Water Storage Tanks to Evaluate the Potential for Vortex Formation and Air Entrainment
Analog Input Point Template, CC Loop A B/U Air Supply Press low, Rev. 1
CHL-039, Emergency Diesel Fuel Oil Log, dated 4/8/07, 2/6/07, and 1/3/07
Colt Industries EDG Lube Oil Consumption Letter, dated 6/27/86
EDG Fuel Oil Consumption Rate Test, dated 1/4/07 and 3/30/05
EPRI Pressurized Water Reactor Primary Water Chemistry Guidelines, Volume 1, Rev. 5
Fisher Controls LTR: Seabrook Tag Numbers 1&2-SW-V0004 & V0005, dated 4/4/07
John Deere Ultra-Low Sulfur Diesel Fuel Information, dated 3/28/07
JPG2001/pwr-19010, Air Entrainment in a Partially Filled Horizontal Pump Suction Line, dated 6/4/01
ISO New England M/LCC 1, Nuclear Plant Transmission Operations, Rev. 5
ISO New England M/LCC 2, Abnormal Conditions Alert, Rev. 9
ISO New England M/LCC 6, System Restoration, Rev. 5
ISO New England M/LCC 12, Voltage and Reactive Control, Rev. 3
Operator Rounds - DG Air Start Pressures, dated 4/15/07 - 4/21/07
Operator Rounds - DG Fuel Oil Storage Tank Levels, dated 4/15/07 - 4/21/07
Review of Work Status of Active Boric Acid leakers, dated 10/28/06
SBK-L-06109, Seabrook Station Licensee Event Report (LER) 2006-003, dated 5/23/06
SOO No. 06-001, Operations Standing Order, dated 1/6/06
SOO No. 07-002, Interim RWST Level Limitation, dated 4/4/07
TMOD/TALT Status Log, dated 2/14/07
TR-6502-1, Alternate Routing and Steam Hammer Loads for the Steam Supply to the EFW Terry Turbine System, dated 2/17/86
UEC Letter No. 145-2 to PSCNH, dated 11/3/88
Westinghouse Letter NF-FP-06-246, New Water Chemistry Guidelines, dated 11/29/06
Work Request, Verify Leakage from Backup Air Supplies to CC-TV-2171-1, 11/3/00

<u>Normal and Special (Abnormal) Operations Procedures</u>
32, Local Alarm Response - SEPS Gen 1 Low Fuel Level, Rev. 0
263, Local Alarm Response - SEPS Fuel Temperature Sensor, Rev. 0
265, Local Alarm Response - SEPS Fuel Temperature Sensor, Rev. 0
266, Local Alarm Response - SEPS Fuel Temperature, Rev. 0
318, Local Alarm Response - SEPS Fuel Supply Pump, Rev. 0
1439, Local Alarm Response - SEPS Fuel Level Low in Day, Rev. 0
1441, Local Alarm Response - SEPS Fuel Level Low in Main, Rev. 0
B6425.PRO, Alarm Response Procedure - CC Loop A B/U Air Sup Press Low, Rev. 5
CX0901.41, SEPS Diesel Fuel Storage Tank Surveillance, Rev. 0
D4248, Alarm Response Procedure - PCCW HX A Out Valve Air Press Low, Rev. 3
D4256, Alarm Response Procedure - Charging Pump A PCCW Flow Low, Rev. 10
D4257, Alarm Response Procedure - Charging Pump B PCCW Flow Low, Rev. 8
D4692, Alarm Response Procedure - LTDN HX Outlet Temperature High, Rev. 3
D4695, Alarm Response Procedure - LTDN HX Outlet Temp HI & Demin Bypass, Rev. 5
D4698, Alarm Response Procedure - VCT Temp High, Rev. 3
D6558.PRO, Alarm Response Procedure - DG A Lube Oil Pressure Low, Rev. 4
D6601, Alarm Response Procedure - DG B Starting Air Pressure Low, Rev. 6
D6614, Alarm Response Procedure - DG B Lube Oil Level Low, Rev. 5

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D6629, Alarm Response Procedure - DG B Trouble, Rev. 10
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D8471, Alarm Response Procedure - 345 KV Line 363 Voltage Low, Rev. 2
D8472, Alarm Response Procedure - 345 KV Line 369 Voltage Low, Rev. 2
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ECA-0.0, Loss of All AC Power, Rev. 35 and Rev. 36
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ES-1.3, Transfer to Cold Leg Recirculation, Rev. 23
F4999, Alarm Procedure: RWST Empty, Rev. 6
F5588, Alarm Response Procedure - EFW Train B Inop, Rev. 4
F7915, Alarm Response Procedure - SW Pump Trip, Rev. 5
F7956, Alarm Response Procedure - SW Header Press Low, Rev. 4
F7998, Alarm Response Procedure - EFW Flow Path Degraded, Rev. 2
F7999, Alarm Response Procedure - EFW System Inop, Rev. 3
F8178, Alarm Response Procedure - CT Bulk Avg Temperature Low, Rev. 0
FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 31
MM-UA-50 A-3, Seabrook Station HWAS Response: RWST Lo-Lo, Rev. 5
ON1061.01, SEPS Operations, Rev. 0
ON1061.02, Receipt of SEPS Fuel Oil, Rev. 0
OP 9.2, EOP User's Guide, Rev. 13
OS1012.03, Primary Component Cooling Water Loop A Operation, Rev. 13
OS1016.01, Service Water System Fill and Vent, Rev. 9
OS1016.03, Service Water Train A Operation, Rev. 10
OS1016.05, Service Water Cooling Tower Operation, Rev. 8
OS1026.13, Operating the DG 1B Fuel Oil System, Rev. 9
OS1035.02, Startup Feed Pump Operation, Rev. 8
OS1046.18, 4.16 kV Breaker Racking Operations, Rev. 0
OS1090.05, Component Configuration Control, Rev. 5
OS1201.01, RCP Malfunction, Rev. 12
OS1201.06, Pressurizer Pressure Instrument / Component Failure, Rev. 12
OS1202.01, Loss of Letdown, Rev. 11
OS1212.01, PCCW System Malfunction, Rev. 10
OS1216.01, Degraded Ultimate Heat Sink, Rev. 11
OS1238.02, Turbine Building Flooding, Rev. 2
OS1246.02, Degraded Vital AC Power (Plant Operating), Rev. 4
OS1412.09, PCCW Monthly Flow Check, Rev. 6
OX1400.02, Remote Safe Shutdown System 18 Month Operability Check, Rev. 6
OX1406.13, Containment Recirculation Sump Valve Cold Shutdown Test, Rev. 5
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OX1416.01, Monthly Service Water Valve Verification, Rev. 7
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OX1436.02, Turbine Driven Emergency Feedwater Pump Quarterly and Monthly Valve Alignment, Rev. 9
OX1436.05, Startup Feed Pump 18 Month Operability Surveillance, Rev. 4
OX1436.08, Startup Feed Pump Quarterly Surveillance, Rev. 9
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UA-9568 A-7, Local Alarm Response - EDG Fuel Oil Storage Tank Low Level, Rev. 6
UA-9568 C-3, Local Alarm Response - EDG Lube Oil Strainer Diff Press High, Rev. 6
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UA-9568 E-2, Local Alarm Response - EDG Lube Oil Temperature High, Rev. 6
UA-9568 E-3, Local Alarm Response - EDG Fuel Oil Day Tank High Level, Rev. 6
UA-9568 E-4, Local Alarm Response - Fuel Oil Day Tank Low Level, Rev. 6
UA-9568 F-2, Local Alarm Response - Lube Oil Temperature Low, Rev. 9

<u>Operating Experience</u>
ACR 98-3155, IN 97-33, Rev. 0
ACR 99-0550, IN 98-25, Rev. 2
SSP# 881314 (RE 02174), Deficiencies in Outside Containment Flooding Protection, dated 10/6/88
LIC# 920975, NRC Information Notice 92-69: Water Leakage from Yard Area Through Conduits into Buildings, dated 10/7/92
LIC# 940249, NRC Information Notice 94-27: Facility Operating Concerns Resulting from Local Area Flooding, dated 4/18/94
NRC Information Notice 83-44, Supplement 1: Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment and Floor Drain System, dated 8/30/90
NRC Information Notice 87-49: Deficiencies in Outside Containment Flooding Protection, dated 10/9/87
NRC Information Notice 92-69: Water Leakage from Yard Area Through Conduits into Buildings, dated 9/22/92
NRC Information Notice 94-27: Facility Operating Concerns Resulting from Local Area Flooding, dated 3/31/94
NRC Information Notice 94-36: Undetected Accumulation of Gas in Reactor Coolant System, dated 5/24/94
NRC Information Notice 94-84: Air Entrainment in Terry Turbine Lubricating Oil System, dated 12/2/94

NRC Information Notice 96-55: Inadequate Net Positive Suction Head of Emergency Core Cooling and Containment Heat Removal Pumps under Design Basis Accident Conditions, dated 10/22/96
NRC Information Notice 97-40: Potential Nitrogen Accumulation Resulting from Backleakage from Safety Injection, dated 6/26/97
NRC Information Notice 98-25: Loss of Inventory from Safety-related, Closed-loop Cooling Water Systems, dated 7/8/98
NRC Information Notice 98-31: Fire Protection System Design Deficiencies and Common-mode Flooding of Emergency Core Cooling System Rooms at Washington Nuclear Project Unit 2, dated 8/18/98
NRC Information Notice 98-40: Design Deficiencies Can Lead to Reduced ECCS Pump Net Positive Suction Head During Design-basis Accidents, dated 10/26/98
NRC Information Notice 2000-20: Potential Loss of Redundant Safety-related Equipment Because of the Lack of High-energy Line Break Barriers, dated 12/11/00
NRC Information Notice 2002-12: Submerged Safety-related Electrical Cables, dated 3/21/02
NRC Information Notice 2005-11: Internal Flooding/spray-down of Safety-related Equipment Due to Unsealed Equipment Hatch Floor Plugs And/or Blocked Floor Drains, dated 5/6/05
NRC Information Notice 2005-30: Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events and Inadequate Design, dated 11/7/05
NRC Information Notice 2006-21: Operating Experience Regarding Entrainment of Air into Emergency Core Cooling and Containment Spray Systems, dated 9/21/06
NRC Information Notice 2006-22: New Ultra-Low-Sulfur Diesel Fuel Oil Could Adversely Impact Diesel Engine Performance, dated 10/2/06

<u>Operator Training</u>
8045, Emergency Feedwater Instructor Guide, dated 11/01/06
Detailed Systems Text: Emergency Core Cooling, Rev. 8
Job Performance Measure L0148J, Open Turbine Building Roll Up Doors in Response to Turbine Building Flooding, Rev. 0
JPM - L0026J, Transfer to Cold Leg Recirculation (CBS-V2 Fails), Rev. 6
JPM - L0133J, Transfer to Cold Leg Recirculation (Without RNO), Rev. 1
JPM - L0139J, Transfer to Cold Leg Recirculation (CBS-V14 Fails), Rev. 0
L8045I, Emergency Feedwater Course Slides
Operator Aid 97-001, Manual Operation of CC-TV-2171-1, dated 2/20/07
Operator Aid 04-006, Diesel Generator B - 1-DGB-TM-9505, dated 4/7/05
Operator Aid 05-006, Diesel Generator B - 1-DG-UM-9589, dated 9/28/05
Operator Aid 06-007, Skill of the Operator Tasks, dated 12/12/06

<u>Preventive Maintenance</u>
1-CC-OT019-040, Train A PCCW System Valve Stroke Test, dated 11/2/06 and 4/18/05
1-CC-T-2171-1-MAN-1-000, Actuator Maintenance, dated 10/17/03
1-CC-T-2171-CAL-1-110, T-2171 PCCW LP-A Supply Header Temp Control Calibration, dated 10/16/06
1-CC-T-FILL-MAN-1-000, Recharging PCCW TCV-2171 Backup Air Supply, dated 10/20/04
1-CS-OT004-00, Weekly Borated Water Source Evaluation, dated 4/12/07
1-DG-10.1-TS-M2-000, Sample Fuel Oil Tank 1-DG-TK-26-A, dated 3/14/07

1-DG-10.2-TS-M2-000, Sample Fuel Oil Tank 1-DG-TK-26-B, dated 3/27/07
1-DG-D-6-B-M1-000, EDG Air Start System Dryer Desicant Replacement, dated 12/27/06
1-DG-OT028-000, Verify EDG Lube Oil, dated 3/18/07 and 3/28/07
1-ECCS-OT065-000, Operability Testing of IST Valves, dated 4/30/05
1-MS-V-395-MAN-1-000, Periodic Inspection of Actuator Internals and Diaphragm Replacement, dated 4/30/05
1-MS-V-395-TEST-000, Periodic Diagnostic Testing of 1-MS-V-395, dated 4/30/05
SWV5-06-AL-S-PV, MOV Diagnostic Testing Summary Report for 1-SW-V-5
SWV5-10-AL-S-PV, MOV Diagnostic Testing Summary Report for 1-SW-V-5

Procedures
CS0924.06, Total Particulate Contamination in Emergency Diesel Fuel Oil, Rev. 6
CS0924.06, Fuel Oil Sampling, Rev. 18
CS0924.11, Water and Sentiment in Distillate Fuels by Centrifuge, Rev. 2
CX0901.22, Diesel Generator Fuel Oil Tank Surveillance, Rev. 14
Engineering Design Standard 37190, Systems Locked Valve Criteria, Rev. 2
ES1850.003, MOV Performance Monitoring, Rev. 5
IS1616.900, Recharging PCCW TCV-2171/TCV-2272 Backup Air Supply, Rev. 0
IS1618.110, CO-FI-4072 Start-Up Feed Pump Recirc Flow Calibration, Rev. 3
LS0550.09, Agastat Timing Relay Acceptance Testing and Maintenance Prog., Rev. 3
LS0569.01, Inspection and Testing of Limitorque Valve Actuators Types SMB, SB and SBD, Rev. 4
LS0569.09, Diagnostic Testing of Butterfly MOVs, Rev. 3
LS0569.16, Diagnostic Testing of Rising Stem MOVs, Rev. 5
LS0569.20, Lubrication PM and Starter Inspection for Motor Operated Valve Actuators, Rev. 0
LX0563.07, 4KV Bus Degraded Voltage Protection Monthly Surveillance, Rev. 1
LX0563.61, 4KV Bus Degraded Voltage Protection Chan Cal & Relay PM, Rev. 2
MN 0523.49 Start-Up Feed Pump Maintenance
MS0519.51, Masoneilan Series 20,000/21,000 Control Valve Maintenance, Rev. 3
MS 0523.26, Horizontal Shaft Alignment, Rev. 6
PEG-30, Performance Monitoring Guidelines, Rev. 5
PEG-36, Station's Top 10 List, Rev. 3
PEG-222, Primary Component Cooling Water System Performance Monitoring, Rev. 2
SM 7.20, Control of Time Critical Actions, Rev. 1

Risk and Margin Management
Individual Plant Examination Report for Seabrook Station, dated March 1991
Review of Seabrook Individual Plant Examination of External Events (IPEEE) Submittal, dated 11/29/00
Risk-Informed Inspection Notebook for Seabrook Station, Rev. 2
Standardized Plant Analysis Risk Model for Seabrook Station (ASP PWR B), Rev. 3

System Health Reports & Trending
1-SW-OT-022, IST Power Operated Valve Data Log, dated 2/27/07
CW System Walkdown Report, dated 4/9/04, 11/22/04, and 12/5/05
IST Power Operated Valve Data Log CBS-V14, dated 11/5/06
MOV Diagnostic Testing Summary Report RHV35, dated 5/8/97 and 11/4/04

Plant Health Committee Meeting Minutes (Meeting No. 2007-4), dated 3/12/07
RWST NR and WR Level Historical Data, dated 4/18/04
Station Top Margin Issues, dated 11/30/06
System Health Report, 125 VDC System, Period 2006-4
System Health Report, 480 MCC, Period 2006-4
System Health Report, 480 VAC Unit Substations, Period 2006-4
System Health Report: Containment Building Spray, Period 2006-4
System Health Report, Diesel Generator System, Period 2006-4
System Health Report, Emergency Feedwater, Period 2006-4
System Health Report, Primary Component Cooling Water, Period 2006-4
System Health Report, Residual Heat Removal Water System, Period 2006-4
System Health Report, Safety Injection, Period 2006-4
System Health Report, Service Water System, Period 2006-4
System Health Report, Switchgear, Period 2006-4
System Health Report, Supplemental Emergency Power System, Period 2006-4
Top Ten Equipment Reliability List, dated 3/19/07
Trend Data for RCS Silica, dated April – June 2005 and 10/06

Vendor Technical Manuals
FP22849, Terry Turbine Instruction Manual, Rev. 14
FP22896, Emergency Feedwater Pumps Instruction Manual, Rev. 17
FP92380, Fisher Continental Butterfly Valves, Rev. 8
Instruction Bulletin No. 72943, LS-240 Bilge Switch & Flooding Alarm Switch P/N 12334, Rev. K
Vendor Drawing - I M 908-0600, SEPS Generator Set Instruction Manual, Rev. 1

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agency-Wide Documents Access and Management System
AOV	Air-Operated Valve
ASME	American Society of Mechanical Engineers
ASME OM	ASME Code for Operation and Maintenance
CAP	Corrective Action Program
CBS	Containment Building Spray
CR	Condition Report
DBD	Design Basis Document
DC	Direct Current
DG	Diesel Generator
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
EOP	Emergency Operating Procedure
EPS	Emergency Power Sequencer
FPL	Florida Power & Light Energy Seabrook, LLC
HX	Heat Exchanger

IMC	Inspection Manual Chapter
IN	Information Notice
IPEEE	Individual Plant Examination of External Events
IST	Inservice Test
JPM	Job Performance Measure
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
MCC	Motor Control Center
MOV	Motor Operated Valve
MR	Maintenance Rule
MS	Main Steam
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OE	Operating Experience
OpESS	Operating Experience Smart Sample
P&ID	Piping and Instrument Diagram
PARS	Publicly Available Records
PCCW	Primary Component Cooling Water
PRA	Probabilistic Risk Assessment
RAW	Risk Achievement Worth
RCP	Reactor Coolant Pump
RHR	Residual Heat Removal
RRW	Risk Reduction Worth
RWST	Refueling Water Storage Tank
SAT	Systematic Approach to Training
SBO	Station Blackout
SDP	Significance Determination Process
SEPS	Supplemental Emergency Power System
SI	Safety Injection
SPAR	Standardized Plant Analysis Risk
SSC	Structure, System, and Component
ST	Surveillance Test
SUFW	Start-up Feedwater
SW	Service Water
TDEFWP	Turbine Driven Emergency Feedwater Pump
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing