January 23, 2004

Mr. Mark E. Warner
Site Vice President
c/o Mr. James M. Peschel
FPL Energy Seabrook, LLC
Seabrook Station
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION - NRC INTEGRATED INSPECTION REPORT 05000443/2003006

Dear Mr. Warner:

On December 31, 2003, the NRC completed an inspection at the Seabrook Nuclear Power Station. The enclosed report documents the inspection findings which were discussed on January 15, 2004, with Mr. G. St. Pierre and other members of your staff.

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

This report documents three NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations in accordance with Section VI.A of the NRC Enforcement Policy.

If you contest the non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspectors at the Seabrook Station.

Since the terrorist attacks on September 11, 2001, the NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial power nuclear power plants during calendar year 2002 and the remaining inspection activities for Seabrook Station were completed during calendar year 2003. The NRC will continue to monitor overall safeguards and security controls at Seabrook Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm.html (the Public Electronic Reading Room).

Sincerely,

/RA/

James Trapp, Chief
Projects Branch 6
Division of Reactor Projects

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

Enclosure: Inspection Report No. 05000443/2003006
w/Attachment: Supplemental Information

cc w/encl:
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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.:	05000443
License No.:	NPF-86
Report No.:	05000443/2003006
Licensee:	Florida Power & Light Energy Seabrook, LLC (FPL)
Facility:	Seabrook Station, Unit 1
Location:	Post Office Box 300 Seabrook, New Hampshire 03874
Dates:	September 28, 2003 - December 31, 2003
Inspectors:	Glenn Dentel, Senior Resident Inspector Steve Shaffer, Resident Inspector Silas Kennedy, Resident Inspector - Millstone Max Schneider, Senior Resident Inspector - Millstone Shani Lewis, Reactor Engineer Roy Fuhrmeister, Senior Reactor Engineer Fred Bower, Senior Reactor Engineer Thomas Burns, Senior Reactor Engineer Thomas Moslak, Health Physicist Steve Barr, Operations Engineer Todd Fish, Operations Engineer
Approved by:	James Trapp, Chief Projects Branch 6 Division of Reactor Projects

CONTENTS

SUMMARY OF FINDINGS

IR 05000443/2003006; 9/28/2003-12/31/2003; Seabrook Station, Unit 1; Operator Performance During Non-Routine Evolutions and Events, Refueling and Outage Activities, and Event Followup.

The report covered a 13-week period of inspection by resident inspectors, regional inspectors supporting the residents, and announced inspections by a regional senior health physics inspector, operations specialists, and a senior reactor inspector. Three Green non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using 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: Initiating Events

- Green. The inspectors identified a non-cited violation of Technical Specification 6.7.1.a, "Procedures and Programs." Seabrook failed to properly implement the procedure for draining the reactor coolant system to a mid-loop condition. Specifically, operators failed to stop draining when the deviation between level instruments did not meet procedural limits. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

  This finding is greater than minor because it affected the Initiating Events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. The procedural limit was established to ensure operators had accurate level indication to prevent challenging residual heat removal pump performance which could upset plant stability. The finding is of very low safety significance since no actual impact on pumps occurred. (Section 1R20)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of Technical Specification 6.7.1.a, "Procedures and Programs." Seabrook failed to properly implement the abnormal operating procedure during high turbine vibrations. The high turbine vibrations occurred following replacement of the "C" low pressure turbine during the ninth refueling outage. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

This finding is greater than minor because it affected the Mitigating Systems cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. The operators failure to properly implement abnormal operating procedures could impact the plant's ability to respond to an initiating event. The finding is of very low safety significance since failure to implement the procedure did not result in a loss of the safety function of a train or system. (Section 1R14)

Cornerstone: Emergency Preparedness

- <u>Green</u>. The inspectors identified a non-cited violation of 10 CFR 50.54(q) and 50.47(b)(4). Seabrook failed to make a prompt declaration of a Notification of Unusual Event in accordance with the Seabrook Station Radiological Emergency Plan following a main generator hydrogen gas leak. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

  The finding was determined to be greater than minor because it affected the Emergency Preparedness Cornerstone objective of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. The finding was determined to be of very low safety significance because Seabrook failed to properly comply with NRC requirements while in the lowest level of the event classifications. (Section 4OA3)

B. <u>Licensee-Identified Violations</u>

None.

REPORT DETAILS

Summary of Plant Status

The plant began the period at full rated thermal power. On October 4, operators commenced a manual plant shutdown to begin the ninth refueling outage. On October 29, the refueling outage was completed and the unit placed back online to the electrical grid. On October 31, the unit experienced an automatic reactor trip due to loss of feedwater flow and subsequent low steam generator level (see Section 4AO3). On November 1, operators restarted the unit and on November 6, the unit reached full power. On November 10, operators declared and exited an Unusual Event for main generator hydrogen leak (see Section 4AO3). On November 11, operators experienced a reactor coolant leak at a flow transmitter (see Section 4AO3). Operators reduced power and took the turbine offline as part of the effort to isolate the leak. On November 12, operators placed the unit online to the electrical grid. On November 13, the unit reached full rated thermal power and operated at or near full power for the remainder of the period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01 - 1 Sample)

a. Inspection Scope

The inspectors reviewed Seabrook's preparation for adverse weather relative to the protection of safety-related structures, systems, and components from cold weather. This review included a walkdown of the emergency feedwater (EFW) pumps to verify implementation of cold weather protection features to ensure continued operability during adverse weather. Specifically, the inspectors verified that cold weather protection features associated with the EFW pumps were identified in Seabrook's procedure, OS1023.64, "Emergency Feedwater Building Heating System Operation," Rev. 7 and were adequate to ensure continued operability during cold weather.

Additionally, the inspectors reviewed the updated final safety analysis report regarding design features, and verified the adequacy and implementation of the following procedures relative to cold weather protection:

- OS1090.09, "Station Cold Weather Operations," Rev. 0, and
- ON1490.06, "Freeze Protection Control Surveillance," Rev. 2

The inspectors reviewed deficiencies identified during the implementation of cold weather protection procedures, and verified these deficiencies were entered into the corrective action program.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

Partial System Walkdowns (71111.04Q - 3 Samples)

The inspectors performed the following partial system walkdowns:

- On October 8, the inspectors performed a walkdown of the "A" residual heat removal (RHR) system while the “B” emergency diesel generator (EDG) was out-of-service for scheduled maintenance. The “B” EDG provides emergency power to the “B” RHR train.

- On October 10, the inspectors performed a walkdown of the service water and cooling tower systems while the service water system was removed from service for service water pump house forebay inspections.

- On October 13, the inspectors performed a walkdown of the spent fuel pool cleanup and cooling system during fuel assembly movement to the spent fuel pool. The inspectors conducted walkdowns of the control room, the essential switchgear, and the spent fuel pool area to verify proper system alignment.

The inspectors conducted a walkdown of each system to verify that the critical portions of selected systems, such as valve positions, switches, and breakers, were correctly aligned in accordance with Seabrook's procedures and to identify any discrepancies that may have had an effect on operability. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope (71111.05Q - 8 Samples)

The inspectors examined several areas of the plant to assess: 1) the control of transient combustibles and ignition sources; 2) the operational status and material condition of the fire detection, fire suppression, and manual fire fighting equipment; 3) the material condition of the passive fire protection features (fire doors, fire dampers, fire penetration seals, etc.); and 4) the compensatory measures for out-of-service or degraded fire protection equipment. The following areas were inspected:

- Turbine building 21’ and 50’ elevations;
- Containment building -26’, 0’, and 25’ elevations;
- Service water pump house, 21’0" elevation;
- Service water switchgear room, 21’0" elevation;
- Cooling tower pump house, 46"0" elevation.

The inspectors verified that the fire areas were in accordance with the following documents:

- Fire Protection Pre-Fire Strategies and Fire Hazard Analysis;
- Compensatory List of Fire Protection Equipment out-of-service;
- Technical Requirements Manual.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) (7111108 - 6 samples)

a. Inspection Scope

The inspectors observed selected samples of nondestructive examination (NDE) activities in process. Also, the inspectors reviewed selected additional samples of completed NDE and repair/replacement activities. The sample selection was based on the inspection procedure objectives and risk priority of those components and systems where degradation would result in a significant increase in risk of core damage. The observations and documentation reviews were performed to verify the activities were performed in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements. The inspectors reviewed a sample of inspection reports and condition reports initiated as a result of problems identified during in-service inspection (ISI) examinations. Also, the inspectors evaluated effectiveness in the resolution of problems identified during selected ISI activities.

The inspectors observed the performance of three NDE activities in process (three samples) and reviewed documentation and examination reports for an additional six NDE activities. The inspectors reviewed two welding activities on a pressure boundary (two samples) and reviewed one ASME repair package for a repair performed during the last operating cycle (one sample).

The inspectors observed manual ultrasonic testing (UT) and magnetic particle testing (MT) activities to verify effectiveness of the examiner and process in identifying degradation of risk significant systems, structures and components and to evaluate the activities for compliance with the requirements of ASME Section XI of the Boiler and Pressure Vessel Code.

The inspectors observed the magnetic particle tests performed on feedwater (FW) flow nozzle to pipe welds 4607-03-01 and 4607-03-02 and reviewed the examination reports of ultrasonic tests of those welds. In addition, the inspectors reviewed the liquid penetrant examination reports of core spray (CS) welds 0327-02-01 and 0327-02-02. The inspectors also reviewed the radiographs and the examiner's interpretation of indications observed within field welds F001 and F002 in the main steam (MS) system and the subsequent repair of weld F001. The inspectors verified that the identification, characterization, disposition and repair of the indications were appropriate.

Seabrook noted an active leak from one control rod drive mechanism (CRDM) during the initial visual examination for boric acid deposits in the vicinity of the CRDM penetration to vessel top head intersections. Upon identification of this leak, the examination was expanded to include a visual examination of all CRDM penetrations for 100% of the circumference at both the upper level (conoseal) location and at the penetration to vessel top head intersection. An additional leak was identified during the expanded inspection. Both leaks were identified as originating at the conoseal (upper) location and not at the penetration to vessel head intersection. The inspectors verified by visual examination that the leaks had originated at the conoseal location and also that the leaks had not caused any visible damage to the reactor vessel head.

Seabrook selected a repair method which used a mechanical clamp to encapsulate and seal the leak location. The inspectors reviewed the repair plans, engineering analysis and technical justification for the use of this mechanical clamp design.

The inspectors evaluated the implementation of the steam generator program by review of specific portions of the steam generator management plan and the condition monitoring and final operational assessments. The inspectors reviewed plant specific steam generator information, tube inspection criteria, control and monitoring of foreign objects, integrity assessments, degradation modes, and tube plugging criteria. The inspectors confirmed that the eddy current examination (ECT) scope and expansion criteria met technical specification (TS) requirements, Electric Power Research Institute (EPRI) Guidelines, and commitments made to the NRC.

The inspectors noted that Seabrook had expanded the scheduled tube inspection for this outage to include a one hundred percent eddy current test of all tubes in the "A", "B", "C" and "D" steam generators. This expansion of the inspection scope was in response to the identification of tube outside diameter cracking in the "D" steam generator during the previous outage. The ECT probes and equipment were qualified for the expected types of active tube degradation.

The inspectors observed a sample of tubes being examined from each generator to verify Seabrook accomplished a one hundred percent examination of their length. The inspectors reviewed sample expansion criteria specified upon the identification of tube cracking and evaluated the tube repair/plugging plans for tubes which failed the repair/plugging criteria. The inspectors evaluated the sample expansion and the repair/plugging criteria against industry guidelines.

To evaluate specific implementation of the steam generator inspection program, the inspectors interviewed data management and acquisition personnel and resolution analysts. The inspectors interviewed Seabrook's independent qualified data analyst, and reviewed selected samples of the eddy current data acquisition and analysis of selected tubes within the "A", "B", "C" and "D" steam generators.

No tubes were identified as candidates for in-situ pressure testing during the inspection. The inspectors confirmed that steam generator leakage was not identified at greater than three gallons per day during the previous operating cycle or during post-shutdown visual inspection of the tube sheet face.

The inspectors reviewed the plan, procedures, and results of the visual examination of selected portions of the containment liner for compliance with the requirements of American Society of Mechanical Engineers (ASME) Section XI, IWE (requirements for class MC and metallic liners of class CC components). Examination reports and Condition Reports (CR) which identified coating failure, corrosion and damage to moisture barriers were reviewed by the inspectors to evaluate corrective actions specified for barrier restoration.

The inspectors reviewed welding activities associated with the repair of selected components to verify the activities were performed in accordance with the requirements of ASME Section IX and XI. The inspectors reviewed selected portions of work document (WD) 01W003103 which provided the repair instructions for the replacement of valve MS-V-394 in the MS system. The inspectors reviewed the joint process control instructions, welding instructions, welding procedure, welding procedure qualification, NDE requirements and the test results of the completed welds. The inspectors reviewed welding procedure specification YA-WP-5, YA-WP-27 and YA-WP-3 and the supporting procedure qualification records for compliance with the requirements of ASME Section IX.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

1. Quarterly Resident Inspector Review (71111.11Q - 1 Sample)

a. Inspection Scope

On December 9, the inspectors observed an operator training session focusing on human performance of time critical tasks. The inspectors reviewed the operators' abilities to correctly evaluate the training scenario and implement the emergency plan. The operator actions were reviewed against Seabrook's procedural requirements. The inspectors also evaluated whether deficiencies were identified and discussed during critiques.

b. Findings

No findings of significance were identified.

2. Biennial Review (71111.11B - 1 Sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Rev. 8, Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program," and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)," as acceptance criteria, 10 CFR 55.46 Simulator Rule (sampling basis).

The inspectors reviewed documentation of operating history since the last requalification program inspection. The inspectors also discussed facility operating events with the resident staff. Documents reviewed included NRC inspection reports and licensee condition reports (CRs) that involved human performance and Technical Specification compliance issues. Specifically, the inspectors reviewed the following plant condition CRs:

- CR 03-10061 Significant steam leak in containment
- CR 03-10043 Unusual Event declared due to main generator hydrogen leak
- CR 03-09823 Reactor trip following loss of "A" main feedwater pump
- CR 03-09703 Inappropriate performance of ON1231.01 abnormal procedure

The inspectors reviewed two reactor operator (RO) and two senior reactor operator (SRO) comprehensive biennial written examinations administered in 2003. The inspectors reviewed three sets of simulator scenarios and 13 job performance measures (JPMs) also administered during this current examination cycle to ensure the quality of these examinations met or exceeded the criteria established in the Examination Standards and 10 CFR 55.59.

The inspectors observed the administration of operating examinations to two crews (i.e., “D” Shift operating crew and staff crew). The operating examination consisted of two simulator scenarios for the operating crew and for the staff crew, and one set of eight (five in-plant and three control room) job performance measures administered to each individual. As part of the examination observation, the inspectors assessed the adequacy of Seabrook’s examination security measures.

The inspectors interviewed four evaluators, two training supervisors, three ROs, and three SROs for feedback regarding the implementation of the licensed operator requalification program. The inspectors also reviewed Operations Training Discrepancy Reports, QA audits, Operations Training self-assessments, and recent plant and industry events to ensure that the training staff modified the program, when appropriate, to recommended changes.

The effectiveness of remedial training was assessed through the review of evaluation records for the past year, including five instances of evaluation failures.

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

- Attendance records for the most recent year training cycle.

- Seven medical records to confirm all records were complete that restrictions noted by the doctor were reflected on the individual's license and that the examinations were given within 24 months.

- Proficiency watch-standing and reactivation records. A sample of six licensed operator watch-standing documentation was reviewed for the current and prior quarter to verify currency and conformance with the requirements of 10 CFR 55.

The inspectors observed simulator performance during the conduct of the examinations, and reviewed simulator performance tests and discrepancy reports to verify compliance with the requirements of 10 CFR 55.46. Seabrook is committed to the ANSI 3.5-1998 standard. The inspectors reviewed simulator configuration control and performance testing through interviews and the review of: facility simulator procedures; open and closed simulator condition reports and discrepancy reports; and the review of test results. Specifically, the following tests were reviewed:

<u>Scenario-based tests</u>

- LORT Examination 03-08 scenario
- LORT Examination 03-17 scenario
- LORT Examination 03-21 scenario

<u>Transient tests</u>

- Transient No. 1 - Manual Reactor Trip
- Transient No. 3 - Simultaneous Closure of all Main Steam Isolation Valves

<u>Core Performance tests</u>

- BOL Cycle 10 Core Performance Test
- Void Coefficient of Reactivity Test based on CR 02-03633

On December 22, the inspectors conducted an in-office review of licensee requalification exam results. These results included the annual operating test only (i.e., the comprehensive written examination was administered last year). The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspectors verified that:

- Crew failure rate on the dynamic simulator was less than 20%. (Failure rate was 0%)

- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Failure rate was 0%)

- Individual failure rate on the walk-through test (JPMs) was less than or equal to 20%. (Failure rate was 0%)

- Individual failure rate on the comprehensive biennial written examination was less than or equal to 20%. (Failure rate was 0%)

- More than 75% of the individuals passed all portions of the examination (100% of the individuals passed all portions of the examination).

b. Findings

No findings of significance were identified.

1R12 Maintenance Implementation (71111.12)

a. Inspection Scope (71111.12Q - 1 Sample)

The inspectors reviewed the application of the maintenance rule for a failure of an emergency feedwater discharge isolation valve to stroke close on an actuation signal (CR 03-09676). The inspectors interviewed engineers, reviewed Updated Final Safety Analysis Report (UFSAR) requirements and specific maintenance rule criteria for the emergency feedwater system, and examined the apparent cause determination and corrective actions. The inspectors reviewed the maintenance rule functional failure evaluation against 10 CFR 50.65 requirements and Seabrook procedural requirements in PEG 45, "Functional Failure Determinations," Rev. 1.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13 - 4 Samples)

a. Inspection Scope

The inspectors reviewed the scheduling and control for one planned maintenance activity and three emergent work troubleshooting activities in order to evaluate the effect on plant risk. The inspectors conducted interviews with operators, risk analysts, maintenance technicians, and engineers to assess their knowledge of the risk associated with the work, and to ensure that other equipment was properly protected. The inspectors evaluated the compensatory measures against Seabrook procedures, Maintenance Manual 4.5, “Configuration Control During Maintenance and

Troubleshooting," and Work Management Manual 10.1, "On-Line Maintenance." Specific risk assessments were conducted using Seabrook's "Safety Monitor." The inspectors reviewed the following items.

- Prior to the ninth refueling, the inspectors reviewed engineering evaluation, EE-0-020, "OR09 Shutdown Safety Evaluation," Rev. 0. The inspectors evaluated the risk assessment, compensatory actions, and additional controls implemented against NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Rev. 3. The inspectors also conducted a post outage review of the overall risk of the outage and specific high risk outage evolutions.

- On October 17, the inspectors reviewed troubleshooting activities in response to a refueling machine problem where the gripper assembly stuck in the latch position while in the process of moving a fuel assembly. The inspectors reviewed the troubleshooting plan and actions taken to identify and correct the condition.

- On October 22, the inspectors reviewed the troubleshooting activities on the "B" emergency feedwater pump following a high outboard motor bearing temperature alarm. The high temperature occurred during testing conducted during the refueling outage following maintenance on the pump.

- On October 30 to November 5, the inspectors reviewed the troubleshooting activities associated with "A" main feedwater pump problems. On October 31, the reactor automatically tripped following loss of flow from the "A" main feedwater pump (see Section 4OA5). The inspectors reviewed troubleshooting plans and correction actions completed before and after the reactor trip. The inspectors also reviewed the management and administrative controls associated with the troubleshooting activities.

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-Routine Evolutions and Events (71111.14 - 1 Sample)

a. Inspection Scope

The inspectors reviewed operator response to high vibrations on the main turbine during startup activities following the refueling outage. The inspectors observed control room activities, reviewed abnormal operating procedures, and interviewed control room operators.

b. Findings

Introduction. The inspectors identified that Seabrook failed to properly implement an abnormal operating procedure for high turbine vibrations. This finding was determined to be of very low safety significance (Green) and was characterized as a non-cited violation (NCV) of TS 6.7.1.a "Procedure and Programs."

Description. On October 27 and 28, operators received turbine high vibration alarms during turbine generator startup following replacement of the "C" low pressure turbine during the refueling outage. On October 27, operators entered their abnormal operating procedure (AOP) ON1231.01, "Turbine Generator High Vibration." Based on the vibration readings and other abnormal indications, operators shut down the turbine. The vibration levels observed were approximately nine mils on turbine bearings seven and eight.

On October 28, operators completed a second turbine "roll" and synchronization of the generator to the electric grid. Operators again received turbine high vibration alarms (vibration levels were again approximately nine mils), entered the AOP, gathered detailed vibration readings, and shut down the turbine. While the turbine slowed in speed, the vibration alarms cleared and the abnormal operating procedure was exited. Upon the turbine slowing further and entering a critical speed, operators received additional vibration alarms. The vibration levels exceeded the AOP entry point of 8 mils for approximately five minutes and vibration levels exceeded the reactor trip criteria of 14 mils for approximately two minutes. Operators directly proceeded to attachment "A" of the AOP to break condenser vacuum rather than process through the steps of the procedure as required. Due to concerns with breaking condenser vacuum at power, operators were evaluating appropriate actions when the vibrations decreased due to transitioning through the turbine critical speed. Therefore, the procedural steps to break vacuum were not implemented. The inspectors concluded that the operators failed to properly implement the AOP, which would have directed operators to trip the reactor and then break condenser vacuum.

Seabrook initiated an "A" level condition report (CR 03-09703) to conduct a root cause analysis and to evaluate corrective actions to this event. Seabrook’s root cause analysis and corrective actions were in progress at the conclusion of this inspection period.

Analysis. The inspectors determined that Seabrook’s failure to properly implement the abnormal operating procedure is a performance deficiency since licensed operators are required to conducted activities in accordance with their procedures. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC’s regulatory function and was not the result of any willful violation of NRC requirements or Seabrook’s procedures.

The finding was more than minor because it affected the Mitigating Systems cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. To ensure reliability of systems, operators must respond properly to alarm conditions. The cornerstone attribute of human performance was affected in that operators failure to properly implement abnormal operating procedures could impact the plant’s ability to respond to an initiating event. Using Appendix A, Phase 1 of Manual Chapter 609, the finding was determined to be of very low safety significance (Green) since failure to implement the procedure did not result in a loss of the safety function of train or system nor was the failure associated with seismic, fire, flooding, or severe weather initiating event. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

Enforcement. TS 6.7.1.a, "Procedures and Programs," requires that written procedures be implemented covering the activities in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Rev. 2, Appendix A. Regulatory Guide 1.33, Appendix A, requires procedures for abnormal conditions. Abnormal Operating Procedure (AOP) ON1231.01, "Turbine Generator High Vibration," directs operators to perform various actions in response to high bearing vibrations, including tripping the reactor when turbine vibration greater than 14 mils is sustained for greater than 10 seconds. Contrary to the above, Seabrook failed to properly implement the abnormal operating procedure, ON1231.01, during high turbine vibrations experienced on October 28, 2003. Because this finding is of very low safety significance and Seabrook entered this finding into the corrective action program (CR 03-09703), this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy. (NCV 50-442/2003-06-01, Failure to Implement Turbine Vibration Abnormal Operating Procedure).

1R15 Operability Evaluations (71111.15 - 4 Samples)

a. Inspection Scope

The inspectors reviewed operability evaluations and/or condition reports in order to verify that the identified conditions did not adversely affect safety system operability or plant safety. In addition, where a component was determined to be inoperable, the inspectors verified the Technical Specifications (TS) limiting condition for operation implications were properly addressed. The inspectors performed field walkdowns, interviewed personnel, and reviewed the following items:

- CRs 03-09060 and 03-09505, which evaluated deficiencies identified during the containment recirculation sump inspection. The deficiencies included debris found in the sump and damage/deformation in the sump screen. The inspectors reviewed engineering evaluation, EE-03029, "Evaluation of ECCS Containment Recirculation Sump Debris for OR09," examined plant non-conformance evaluation, "Broken Wire in Containment Recirculation Sump Screen Provides a Dimension Larger than Nominal Diagonal Dimension," and conducted independent walkdowns of the sump.

- CR 03-09618, which evaluated the impact of thermal stresses due to back leakage into the emergency feedwater lines on October 26. The inspectors reviewed the cause of the back leakage, evaluation of the impact of the high temperatures on the system, and overall function and design of check valves in the system.

- CR 03-09260, which evaluated the impact of an air bubble that passed through the "B" charging pump and damaged the mechanical seal during post maintenance testing following relief valve maintenance. The inspectors reviewed inservice testing data, vibration data, and other pump performance monitoring to determine the operability of the pump. In addition, the inspectors examined the work orders associated with the relief valve maintenance (WO 02-33895), troubleshooting of the charging pump mechanical seal failure (WO 03-35631), and ultrasonic inspection of the charging suction piping (WO 03-16279).

- CR 03-08245, which evaluated the "A" EDG test, where frequency did not reach steady state conditions within 15 second time period on October 2. The inspectors reviewed the EDG's output during the test and ensured that the EDG would still meet its designed safety function. The inspectors also reviewed the corrective actions associated with the CR.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds (71111.16 - 1 Sample)

a. Inspection Scope

The inspectors reviewed in detail one specific operator work-around.

Feedwater Isolation Valves

The inspectors reviewed the actions required by operators to open the Feedwater Isolation Valves (FWIVs) after an isolation signal. The valves intermittently do not automatically open after an isolation signal when the operators signal the valves to open. The inspectors reviewed CR 03-09825 evaluating an FWIV failure to open. The inspectors reviewed emergency operating procedures, engineering calculations, and environment conditions that could impact manual operator actions.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

Resident Periodic Inspection (71111.17A - 1 Sample)

a. Inspection Scope

The inspectors reviewed Design Change Request (DCR) 01-005, which described the installation of a new governor installed on the “A” EDG during the refueling outage. The new governor is part of several corrective actions to the “B” EDG failure in November 2000. The governor allows for slow starts of the EDG to minimize premature wear of components caused by fast starts during required surveillance testing. The inspectors observed portions of the installation activities, performed visual inspections of the EDGs, and interviewed the EDG system engineer. The inspectors verified that controls were in place to protect the risk significant circuitry and other components in the area. The inspectors also verified that the design package was evaluated properly in accordance with 10 CFR 50.59.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 3 Samples)

a. Inspection Scope

The inspectors reviewed post maintenance testing (PMT) activities to ensure: 1) the PMT was appropriate for the scope of the maintenance work completed; 2) the acceptance criteria were clear and demonstrated operability of the component; and 3) the PMT was performed in accordance with procedures. The following PMTs were reviewed:

- On October 16 through 19, EX1804.066, “Alpha Diesel Generator Governor Post Modification Testing,” Rev. 2, following a replacement of the governor per DCR 01-005.

- On October 19, OX1436.03, “Electric Driven Emergency Feedwater Pump,” following replacement of pump internals per WO’s 0234760 and 0310670.

- On November 7, OX1456.01, "Charging Pump A & B Quarterly Flow and Valve Stroke Test and 18 Month Remote Position Indication Verification," Rev. 10, and ES1850.002, "Vibration Program," Rev. 2 following replacement of the "B" charging pump's motor inboard bearing oil ring completed in accordance with WO 032594.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20 - 1 sample)

a. Inspection Scope

The inspectors reviewed operational, maintenance, and scheduling activities prior to and during the ninth refueling outage to evaluate Seabrook's ability to assess and manage the outage risk. Prior to the outage, the inspectors reviewed the outage plan and the risk assessment of the schedule (see Section 1R13 for more details). During the outage, the inspectors examined the following activities: shutdown of the plant; cooldown; mid-loop operations; fuel handing operations; evacuation and fill of the RCS; heatup; and plant startup. The inspectors reviewed applicable procedures, observed control room activities, conducted walkdowns, and interviewed key personnel. The inspectors also conducted periodic outage reviews of the following items: clearance activities; reactor coolant system instrumentation; electrical power configuration; residual heat removal system operation; spent fuel pool cooling system operation; inventory control measures; reactivity control measures; and containment closure requirements. Specific documents reviewed during the inspection are listed in the Attachment. The inspectors evaluated the activities against Technical Specification requirements, Seabrook's procedures, Seabrook's commitments in response to Generic Letter 88-17, and other applicable requirements.

b. Findings

Mid-loop Operation

Introduction. The inspectors identified that Seabrook failed to properly implement the procedure for draining reactor coolant system to a mid-loop condition. This finding was determined to be of very low safety significance (Green) and was characterized as an NCV of TS 6.7.1.a "Procedure and Programs."

Description. On October 9, operators used procedure OS1000.12, "Operation with RCS at Reduced Inventory/Midloop Conditions," Rev. 4 to drain down the RCS level to Mid-loop condition to facilitate inspection of the steam generators during the ninth refueling outage. Operators controlled level changes using the charging and letdown system and monitored vessel level using several instruments including two differential pressure level instruments, two ultrasonic level instruments, and a tygon tube level instrument. Of the five instruments, two ultrasonic level instruments (RC-LM-9465 and 9466) and one differential pressure level instrument (RC-LIT-9467) was considered narrow range mid-loop level detectors. Level indication and level control were important to prevent vortexing or cavitation of the residual heat removal pumps. The minimum level to prevent potential damage to the RHR pumps was determined to be 78 inches below the reactor flange. The procedure also specified that the narrow range instruments must agree within five inches of each other or the drain down must be stopped and the reason determined for the level indication anomaly.

The inspectors identified that the five-inch limit was exceeded as documented on seven consecutive level readings recorded every 15 minutes between 1:00 p.m. and 2:30 p.m. on October 9. Based on interviews and review of recorded data, the inspectors concluded that operators failed to stop draining and determine the cause of the level anomaly when the level instruments did not agree within 5 inches. The lowest level recorded was 76.7 inches below the RCS flange (on RC-LIT-9467) and the highest level indication difference was 5.5 inches. Operators later removed RC-LIT-9467 from service for calibration due to concerns with the accuracy of the instrument.

Analysis. The inspectors determined that Seabrook's failure to properly implement the RCS draining to mid-loop procedure is a performance deficiency since licensed operators are required to conducted activities in accordance with their procedures. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or Seabrook's procedures.

The finding was more than minor because it affected the Initiating Events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. The cornerstone attribute, human performance, was affected in that operators' failed to follow their procedural guidance. The administrative limit was established to ensure operators had accurate level indication to prevent challenging RHR pump performance which could upset plant stability. In addition, the inspectors identified a previous example during the refueling outage where operators did not ensure a limit was met prior to proceeding (CR 03-08319). Therefore, using NRC Manual Chapter 0612, Appendix E, example 2.c., the inspectors concluded the performance deficiency was more than minor. NRC Manual Chapter 0609, Appendix G, "Shutdown Operations - Significance Determination Process," was used to determine the overall safety significance. Based on Table 1 for Reactor Coolant System Open and Refueling Cavity Level Less than 23 feet, the finding was of very low safety significance (Green) since no actual impact on RHR occurred and Core Heat Removal and Inventory Guidelines were implemented. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

Enforcement. TS 6.7.1.a, "Procedures and Programs," requires that written procedures be implemented covering the activities in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Rev. 2, Appendix A. Regulatory Guide 1.33, Appendix A, requires procedures for operation including draining of reactor coolant system. OS1000.12, "Operation with RCS at Reduced Inventory/Midloop Conditions," requires "when less than minus 71 inches ... if narrow range mid-loop level detectors do not agree within 5 inches, stop draining." Contrary to the above, operators failed to stop draining when the deviation between level instruments did not meet the 5-inch limit. The instruments did not agree within the 5-inch limit for seven consecutive level readings recorded every 15 minutes between 1:00 p.m. and 2:30 p.m. on October 9. Because this finding is of very low safety significance and Seabrook entered this finding into the corrective action program (CR 04-00449), this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy (NCV 50-442/2003-06-02, Failure to Properly Implement Procedure for RCS Draining to Mid-loop).

1R22 Surveillance Testing (71111.22 - 5 Samples)

a. Inspection Scope

The inspectors observed portions of surveillance testing activities of safety-related systems to verify that the system and components were capable of performing their intended safety function, to verify operational readiness, and to ensure compliance with required Technical Specifications and surveillance procedures.

The inspectors attended some of the pre-evolution briefings, performed system and control room walkdowns, observed operators and technicians perform test evolutions, reviewed system parameters, and interviewed the system engineers and field operators. The following surveillance procedures were reviewed.

- On October 3, EX1808.014, “Containment Enclosure Emergency Exhaust Filter System 18 Month Surveillance,” Rev. 2. This surveillance was performed to demonstrate that the containment enclosure exhaust filter system meets or exceeds in designed capabilities. The inspectors reviewed the procedure and test results.

- On October 4, OX1401.09, "Reactor Vent Paths Cold Shutdown and 18 Month Surveillance," Rev. 7. This surveillance was performed to demonstrate operability of the pressurizer power operated relief valves (PORVs) prior to entering Mode 4 from Mode 3.

- On October 15, OX1505.13, "Safety Injection Comprehensive Pump Test," Rev. 0.

- On October 22, EX1803.003, “Reactor Containment Type B and C Leakage Rate Tests,” Rev. 6. This surveillance was performed to leak test containment penetrations and containment isolation valves to determine that the leakage rate is within the acceptable limits specified in technical specifications.

- On October 23, OX 1426.21, "Diesel Generator 1B 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance," Rev. 2.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

a. Inspection Scope

The inspectors reviewed temporary modification, 03-010, and associated implementing documents to verify Seabrook’s design basis and affected system/component operability were maintained. The modification involved use of temporary equipment to provide a supply of air to the main generator breaker and was originally installed as an emergency temporary modification.

The inspectors interviewed engineers and operators, completed field walkdowns, and reviewed the following documents:

- Maintenance Manual, MA 4.3A, “Temporary Modifications and Temporary Alterations,” Rev. 16;
- Work Management Manual, WM 8.1, "Work Request Performance and Closeout," Rev. 4;
- WM 8.4, "Work Order Process," Rev. 1.

The inspectors verified that the temporary modification was completed in accordance with NRC requirements and plant procedures. The procedural requirements included modifications to plant drawings, tagging of plant equipment affected by the temporary modification, and procedural changes. The inspectors verified 10 CFR 50.59 reviews and 10 CFR 50.65(a)(4) risk evaluations were completed correctly. The inspectors also examined the combined effect of the modification with the other outstanding temporary modifications.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness [EP]

1EP6 Drill Evaluation (71114.06 - 1 Sample)

a. Inspection Scope

The inspectors reviewed the operators emergency classification and notification completed during requalification training on December 9 (See Section 1R11). The inspectors evaluated the results against Seabrook's Emergency Response Manual 1.1, "Classification of Emergencies" and Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 2.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety [OS]

2OS2 ALARA Planning and Controls (71121.02 -15 samples)

a. Inspection Scope

On October 20 to 23, the inspectors conducted the following activities to verify that Seabrook was properly implementing operational, engineering, and administrative controls to maintain personnel exposure as low as is reasonably achievable (ALARA) for tasks conducted during the refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and Seabrook's procedures.

Radiological Work Planning

The inspectors reviewed pertinent information regarding cumulative exposure history, current exposure trends, and ongoing activities to assess current performance and exposure challenges. The inspectors determined the plant's 3-year rolling collective average exposure.

The inspectors reviewed the refueling outage work scheduled during the inspection period and the associated work activity exposure estimates. Scheduled work reviewed included refueling cavity draindown/decontamination, containment demobilization, and containment preclosure inspections.

The inspectors reviewed procedures associated with maintaining worker dose ALARA and with estimating and tracking work activity specific exposures.

The inspectors reviewed the OR09 Project Dose Summary Report, detailing the worker estimated and actual exposures, through October 22, 2003, for jobs performed during the refueling outage.

The inspectors evaluated the exposure mitigation requirements, specified in ALARA Reviews (AR), and compared actual worker cumulative exposure to estimated dose for tasks associated with these work activities. Jobs reviewed included Reactor Vessel Disassembly/Reassembly (AR 03-02), Steam Generator Primary Maintenance (AR 03-03), Steam Generator Secondary Maintenance (AR 03-04), Reactor Vessel Bottom Mounted Instrumentation Inspection (AR 03-15), and Reactor Head Conoseal Seal Leak Repair (AR 03-16).

The inspectors evaluated the departmental interfaces between health physics, operations, maintenance crafts, and engineering to identify missing ALARA program elements and interface problems. The evaluation was accomplished by interviewing the ALARA Coordinator, Electrical Maintenance Supervisor, and I&C Supervisor; reviewing Radiation Safety Committee Meeting minutes (Nos. 03-01, 03-02, and 02-03); reviewing outage related Nuclear Assurance Quality Reports; and attending pre-job briefings for jobs in progress (cavity decontamination and containment closeout inspection).

The inspectors compared the person-hour estimates provided by maintenance planning and other work groups with actual work activity time requirements and evaluated the accuracy of these time estimates. Specific work activities evaluated included the Reactor Vessel CRDM Conoseal Seal Leak Repair, Reactor Vessel Disassembly/Reassembly, Steam Generator Eddy Current Testing and Tube Plugging, and Steam Generator Primary/Secondary Maintenance.

The inspectors determined if work activity planning included the use of temporary shielding, system flushes, and operational considerations to further minimize worker exposure. The inspectors reviewed temporary shielding requests (TSR) for the Residual Heat Removal System Piping (03-002, 03-003), Spent Fuel Pool piping (03-

0019), and Fuel Transfer tube (03-0017). The inspectors also reviewed reactor coolant chemistry data taken subsequent to the peroxide flush.

The inspectors reviewed the revised ALARA Review and post job evaluation for the Reactor Vessel CRDM Conoseal Seal Leak Repair (AR 03-16) to determine if revised dose projections were properly justified and that lessons learned from the activity were being addressed.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the assumptions and basis for the current annual collective exposure estimate and the refueling outage dose projection.

The inspectors reviewed Seabrook's method for adjusting exposure estimates, and replanning work, when emergent work was encountered.

The inspectors reviewed Seabrook's exposure tracking system to determine whether the level of dose tracking detail, exposure report timeliness, and exposure report distribution was sufficient to support the control of collective exposures. Included in this review were the Radiation Work Permits (RWP) for cavity decontamination (RWP 62-1), and containment closure inspections (RWP 4-2).

Job Site Inspection and ALARA Control

The inspectors observed maintenance and operational activities being performed for refueling cavity decontamination and containment closure inspections to verify that radiological controls, such as required surveys, job coverage, and contamination controls were implemented; personnel dosimetry was properly worn; and that workers were knowledgeable of work area radiological conditions.

The inspectors reviewed the exposures of individuals in selected work groups, including electrical maintenance, contractors, instrumentation & control, and radiation protection to determine if supervisory efforts were being made to equalize doses among the workers. The inspectors also interviewed an electrical maintenance supervisor, health physics supervisor, and an instrumentation & control supervisor regarding this matter.

Source Term Reduction and Control

The inspectors reviewed the current status and historical trends of the plant's source terms. Through interviews with the Chemistry Manager and ALARA Coordinator, the inspectors evaluated Seabrook's source term control strategy. Specific strategies being employed by Seabrook included post shutdown peroxide flushes of reactor coolant piping and use of improved filter media for reactor coolant cleanup.

Radiation Worker Performance

The inspectors observed radiation worker and health physics technician performance during cavity draindown/decontamination, containment closure inspections, and water processing. The inspectors determined whether the individuals were aware of current radiological conditions, access controls, and that the skill level was sufficient with respect to the radiological hazards and the work involved.

The inspectors attended the pre-job briefings for exposure significant tasks performed during the inspection period to determine the adequacy and accuracy of information provided to workers. Pre-job briefings attended included refueling cavity draindown and decontamination, and containment closure inspections.

The inspectors reviewed condition reports, related to radiation worker and radiation protection technician errors, and personnel contamination reports (PCR) to determine if an observable pattern traceable to a similar cause was evident.

Declared Pregnant Workers

The inspectors determined that there were no declared pregnant workers performing outage related activities during the inspection period.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification (71151 - 2 Samples)

1. Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors reviewed implementation of Seabrook's Occupational Exposure Control Effectiveness Performance Indicator (PI) Program. Specifically, the inspectors reviewed recent Condition Reports (CR), and associated documents, for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures against the criteria specified in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2, to verify that all occurrences that met the NEI criteria were identified and reported as performance indicators.

b. Findings

No findings of significance were identified.

2. RETS/ODCM Radiological Effluent Occurrences

a. Inspection Scope

The inspectors reviewed a listing of relevant effluent release reports for the period October 1, 2002 through October 1, 2003, for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences per site that exceed liquid and gaseous effluent thresholds.

The inspectors reviewed the following documents to ensure the licensee met all requirements of the performance indicator from the fourth quarter 2002 to the fourth quarter 2003 (4 quarters):

- monthly projected dose assessment results due to radioactive liquid and gaseous effluent releases;
- quarterly projected dose assessment results due to radioactive liquid and gaseous effluent releases; and
- dose assessment procedures.

a. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 3 Samples)

1. Emergency Diesel Generator (EDG) Exhaust Valve Belleville Washer Cracking

a. Inspection Scope

On June 10, 2003 during the planned preventive maintenance on the “A” EDG, maintenance technicians identified that four of six Belleville washers on the right side exhaust valve of the No. 3 cylinder were fractured and the exhaust valve holddown bolts were loose. The immediate corrective action was to expand the inspection to all cylinders on the “A” EDG and one additional cracked washer was found on the No. 4 cylinder. The cracked washers and four additional washers with unusual wear marks were replaced. An operability determination (OD) was performed in conjunction with the CR 03-5007 for the issue and the “B” EDG was run to verify operability. The inspectors verified that the inspection of the OD was documented in NRC Inspection Report 50-443/2003-003. The “B” EDG exhaust valve washers were inspected in July 2003. A root cause analysis team was formed to evaluate the washer failures.

This issue was selected for review due to the frequency of the EDG equipment problems and the risk significance of the EDG. The inspectors reviewed the root cause analysis and discussed the issue with system engineering personnel and the root cause analysis team leader. The review was performed to verify:

- the technical adequacy and thoroughness of the root cause analysis;

- completeness, accuracy and timeliness of the problem identification and significance;
- evaluation and disposition of performance issues associated with maintenance effectiveness;
- consideration of extent of condition, generic implications, common cause, previous occurrences and site-specific and industry operating experience;
- classification and prioritization of the problem resolution;
- identification of root and contributing causes of the problem;
- identification of appropriate corrective actions; and,
- timely completion of corrective actions commensurate with the issue's safety significance and verification that interim corrective actions and/or compensatory actions were identified and implemented to minimize the problem and/or mitigate its effects, until the implementation of the permanent corrective actions.

A complete listing of documents reviewed are included in the Attachment.

b. Findings

No findings of significance were identified and the inspectors identified no concerns with the root cause analysis and corrective actions specified. Seabrook personnel identified the root cause of the cylinder exhaust valves' Belleville washers to be cyclic-induced material fatigue failure most likely due to the washers having reached the end of their service life. Additional corrective actions that are planned or have been completed, included: (1) replacing all the exhaust valve Belleville washers on both EDGs during the refueling outage in October 2003; (2) creating a preventive maintenance task to replace all EDG exhaust valve Belleville washers every eight refueling cycles or every 12 years; and, (3) developing procedure enhancements to provide specific inspection and torque instructions when maintenance is performed on the EDG exhaust valves.

The inspectors observed that Mechanical Maintenance Procedure, MS0539.37, Emergency Diesel Generator Engine Cylinder Head Maintenance, was still in effect. The inspectors also noted that the issue of the new procedure developed to provide enhanced Belleville washer inspection and torque instructions, MX0539.63, Emergency Diesel Generator Exhaust Valve Removal, Replacement and Belleville Washer Replacement, was pending. The inspectors observed that Seabrook did not implement an available formal barrier to prevent the use of the existing EDG maintenance procedure (MS0539.37) that has not been revised to incorporate the additional lessons learned instructions regarding EDG exhaust valves' Belleville washers. The inspectors determined that less formal barriers, including maintenance and engineering EDG expert reviews of work orders prior to maintenance performance, were in place. Seabrook personnel initiated CR 03-10354 to address the failure to use the formal administrative barrier to preclude the use of a procedure requiring revision prior to its next use into the corrective action program for disposition.

2. EDG Low Lube Oil Pressure Trip Issues

a. Inspection Scope

On June 11, 2003, the "A" EDG tripped on low lube oil pressure during the start for a post maintenance test (PMT) run. During the maintenance performed before the PMT, the EDG lube oil system had been partially drained to support maintenance on the engine. Additionally, the engine was barred over to support maintenance including cylinder valve tappet clearance verification. The lube oil system was filled and vented in preparation for the test. As part of the filling and venting process, the engine was air barred over in an attempt to draw oil from the sump, fill the discharge piping and sweep the air in the discharge piping downstream of the attached lube oil pump check valve where it could be purged using the auxiliary lube oil pump. During the first air-barring, station personnel questioned whether the discharge from the discharge piping vent valve was indicative of filled and vented piping. The EDG was air-barred a second time with similar results. Subsequently, the EDG was started for the PMT and tripped on low lube oil pressure. During the start, station personnel noted that lube oil system pressure was building, but did not reach the pressure required to prevent a low pressure trip once the time delay relay was cleared. An OD was performed in conjunction with the CR 03-05105 for the issue. The inspectors verified that the inspection of the OD was documented in NRC Inspection Report 05000443/2003-003. Troubleshooting was performed; the attached lube oil pump and its integral relief valve were replaced; and the "A" EDG was returned to service.

This issue was selected for review due to the repetitive problems experienced with the EDG Oil System and the risk significance of the EDGs. The inspectors reviewed the root cause analysis, discussed the issue with system engineering personnel and the root cause analysis team leader. The review was performed to verify:

- the technical adequacy and thoroughness of the root cause analysis;
- completeness, accuracy and timeliness of the problem identification and significance;
- evaluation and disposition of performance issues associated with maintenance effectiveness;
- consideration of extent of condition, generic implications, common cause, and previous occurrences;
- classification and prioritization of the problem resolution;
- identification of root and contributing causes of the problem;
- identification of appropriate corrective actions; and,
- timely completion of corrective actions commensurate with the issue's safety significance and verification that interim corrective actions and/or compensatory actions were identified and implemented to minimize the problem and/or mitigate its effects, until the implementation of the permanent corrective actions.

A complete listing of documents reviewed are included in the Attachment.

b. Findings

No findings of significance were identified. The inspectors concluded that the root cause identified by the evaluation team was focused on a degraded lube oil pump that could not overcome air trapped in the lube oil system and did not address the failure to fully fill, vent and prime the lube oil system. Measures taken to confirm that the pump was degraded, including verifying clearances and tolerances internal to the pump, have been inconclusive in confirming that the pump was degraded. Testing to confirm that the pump was degraded has not been performed and since the as-found condition of the pump was disturbed, and replicating the as-found condition appears unlikely, it is unclear whether pump degradation at the time of the event can ever be confirmed. Lube oil pump degradation may have been a contributing cause of the “A” EDG to trip on low oil pressure during the post maintenance test on June 11, 2003.

The inspectors concluded that the root cause of the event was the failure to fully fill, vent and prime the lube oil system. The inspectors concluded that this was also the root cause for two previous events (the November 2000 bearing failure and the April 2002 EDG trip) which were also identified during post maintenance testing. Based on discussions with station personnel, the inspectors noted that the corrective action (drilling a hole in the check valve disk) for the June 2003 EDG trip was considered as a potential corrective action to the April 2002 event but administrative controls were selected over a modification as the preferred corrective action. Other potential corrective actions to implement a more positive means to ensure that the system was full, including the use of ultrasonic examination, were not implemented. The inspectors concluded that the corrective action issues were minor since the problem manifested itself during post maintenance testing while the EDG was inoperable and did not impact past operability of the EDG. In addition, the current corrective actions included completing the check valve design modification. The “A” EDG modification was completed during the recent refueling outage and “B” EDG modification is planned for the next diesel outage.

3. Containment Enclosure Emergency Exhaust Filter System Test Failure

a. Inspection Scope

On May 25 and May 26, 2002, the Containment Enclosure Emergency Exhaust Filter System (CEVA) 18 Month Surveillance test failed twice. This failure was addressed in CR 02-09025. Seabrook determined during the apparent cause evaluation that the reason for the initial failures were due to air leakage from CEVA to the Primary Auxiliary Building (PAB). Additional analysis determined that leakage from CEVA to the PAB would not be a concern during accident conditions. Based on this analysis, the test criteria was changed to allow testing CEVA vacuum with the atmosphere instead of in relation to the PAB. The inspectors reviewed the analysis and conclusion to verify that no reduction in public health and safety would occur from the change in testing methodology.

b. Findings

No findings of significance were identified. The inspectors concluded the apparent cause analysis and corrective actions were appropriate.

4. ALARA Planning and Controls

a. Inspection Scope

The inspectors reviewed Nuclear Assurance Quality Reports and Daily Quality Summary reports relating to the implementation of physical, engineering, and administrative controls for performing work in radiologically controlled areas. The inspectors also reviewed seventeen (17) Condition Reports, relating to maintaining personnel exposure ALARA, to evaluate the threshold for identifying, evaluating, and resolving problems in implementing this program. This review was conducted against the criteria contained in 10 CFR 20, Technical Specifications, and Seabrook's procedures.

b. Findings

No findings of significance were identified.

5. In-service Inspection

a. Inspection Scope

The inspectors reviewed a sample of corrective action reports shown in Attachment, which identified flaws discovered during this and previous outages. The inspectors verified that flaws identified during nondestructive testing were reported, characterized, evaluated and appropriately dispositioned and entered into the corrective action program.

b. Findings

No findings of significance were identified.

6. Routine Condition Report Screening

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems", and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the Seabrook's corrective action program. This review was accomplished by accessing Seabrook's computerized database.

b. Findings

No findings of significance were identified.

4OA3 Event Followup (71153)

1. Reactor Coolant System Leak

a. Inspection Scope

At approximately 9:00 a.m. on November 11, operators received multiple indications (containment gaseous and particulate radiation alarms, leak rate alarm, and increased containment sump pump out rates) of a reactor coolant system (RCS) leak in containment. The leak was quantified to be approximately seven to eight gallons per minute (gpm) and normal charging and letdown system adjustments were able to maintain RCS inventory stable.

Following initial containment entries and evaluation of control room indications, operators determined that the leak was from an RCS loop 3 flow transmitter. Based on operating experience and the reactor protection scheme logic, operators commenced a reduction to 48 percent power prior to isolation of the transmitter to reduce the chance of a reactor trip. The attempt to isolate the transmitter, using isolation valves near the transmitter itself, was unsuccessful. Operators reduced power further to approximately 8 percent power and shut down the turbine generator from the electrical grid. Operators performed this action to reduce the radiological impact of closing the transmitter's root isolation valve near the RCS loop. This isolation was successfully completed and the leak was stopped. The RCS leak existed for approximately 16 hours.

The inspectors responded to the control room promptly and observed operator response to the leak. The inspectors verified the following: 1) use of abnormal operating procedures; 2) implementation of Technical Specification requirements for RCS pressure boundary leakage, unidentified RCS leakage, and identified leakage; and 3) evaluation of emergency preparedness classification of the leak. The inspectors, with support from regional specialists, also reviewed plant response to the event including: 1) radiological controls of the various containment entries; 2) event team and online control center evaluation into the cause of the leak and immediate actions to address the leak; and 3) overall actions taken in response to the RCS leak. Specific documents reviewed during the inspection are listed in the Attachment.

NRC performance indicators address reactor coolant system identified leakage. The white threshold is exceeded when the maximum identified leakage exceeds 50 percent of the TS value. In this event, Seabrook exceeded this threshold (7 to 8 gpm was greater than 50 percent of 10 gpm TS limit). In accordance with the NRC action matrix, a supplemental inspection will be conducted to review Seabrook's root cause analysis and corrective actions (in Seabrook's corrective action program under CR 03-10690).

b. Findings

No findings of significance were identified.

2. Automatic Reactor Trip

a. Inspection Scope

At 7:48 p.m. on October 31, Seabrook experienced an automatic reactor trip due to low steam generator level. The low steam generator level resulted from an unexpected reduction in feedwater flow following a transfer of the "A" main feedwater pump from manual to automatic mode of operation. Engineers had been conducting troubleshooting activities associated with the "A" main feedwater pump due to anomalies observed following the refueling outage (see Section 1R13). Plant systems responded normally to the reactor trip and the emergency feedwater system provided, as designed, a supply of emergency water to the steam generators.

Initial troubleshooting activities following the trip identified a failed circuit board in the "A" main feedwater pump control system and a mis-drilled taper pin hole associated with the feedwater pump control oil system. The circuit board was replaced and pin hole was plugged. On November 5, the "A" main feedwater pump was returned to service. On November 6, unit returned to full power operation. The root cause analysis, extent of condition evaluation, and corrective actions (CR 03-09823) was ongoing at the end of the inspection period. The inspectors will evaluate the root cause analysis and corrective actions as part of the planned review of the licensee event report.

b. Findings

No findings of significance were identified.

3. (Closed) LER 50-443/03-01: Non-Compliance with the Requirements of Technical Specification 3.8.1.1 action b.

On June 10, 2003, the “A” emergency diesel generator (EDG) was declared inoperable during the performance of maintenance activities. Operators subsequently failed to meet the requirements of TS 3.8.1.1 action b to perform a test under loaded conditions. This issue was previously reviewed and documented in NRC Inspection Report 50-443/2003-003 as a non-cited violation with very low safety significance (Green finding). The inspectors reviewed the accuracy of the licensee event report, examined the effectiveness of the corrective actions described in CR 03-05263, and verified compliance with the reportability requirements. No additional findings of significance were identified.

4. Main Generator Hydrogen Leak

a. Inspection Scope

The inspectors reviewed operators' response to a hydrogen leak at the main generator. The inspectors observed the immediate actions taken to mitigate the leak and reviewed the implementation of the site's emergency plan.

b. Findings

Introduction. The inspectors identified that Seabrook failed to promptly classify an Unusual Event in accordance with emergency procedures. This finding was determined to be of very low safety significance (Green) and was characterized as an NCV of 10 CFR 50.54(q), 50.47(b)(4), and Section 9.1 of the Seabrook Station Radiological Emergency Plan (SSREP).

Description. On November 10, at 8:05 a.m. a nonlicensed operator (NSO) reported hearing a gas leak on the Northwest corner of the main generator. Through investigation by the NSO and the onsite fire brigade leader, the leak was verified to be hydrogen coming from a small tapped hole on the horizontal face of the generator. At 8:30 a.m., the fire brigade leader reported that the hydrogen concentration near the generator was in excess of flammable limits. Operators and the fire brigade leader took mitigating actions to reduce the leak and protect onsite personnel. At 8:57 a.m., a plug was reinstalled and the hydrogen leak was terminated. At 9:08 a.m., operators declared and exited an Unusual Event (UE). Following the declaration, operators notified state agencies within the 15 minute requirement.

The SSREP states that a condition will be classified "upon recognition of abnormal station conditions [in excess of emergency action levels]" The inspectors concluded that once operators were aware of the hydrogen levels in excess of flammable limits, the emergency action level for flammable gases was met. The criteria for an Unusual Event was a release of flammable gas from anywhere onsite that may adversely impact normal station operation. Operators declared the UE approximately 38 minutes after conditions for entering an UE were met. The inspectors concluded this did not meet the procedural requirement to classify "upon recognition."

Analysis. The inspectors determined Seabrook's failure to implement its emergency classification and action level scheme in a timely manner as required by the SSREP was a performance deficiency. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or Seabrook procedures.

The finding was more than minor because it was associated with the emergency response organization performance attribute of the Emergency Preparedness Cornerstone and affected the cornerstone objective of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency.

The finding was determined to be associated with an actual event implementation problem, and its significance was assessed using Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process (SDP)." Using the Emergency Preparedness SDP Sheet 2, "Actual Event Implementation Problem," the inspectors determined the finding was of very low safety significance because Seabrook failed to implement a risk significant planning standard (10 CFR 50.47(b)(4)) during an actual Unusual Event. This finding, which involved operators failure to implement a procedure, was associated with the cross cutting area of human performance.

Enforcement. 10 CFR 50.54(q) requires, in part, that a licensee shall follow and maintain in effect emergency plans which meet the standards in 10 CFR 50.47(b). 10 CFR 50.47(b)(4) requires, in part, that a standard emergency classification and action level scheme is used. The SSREP sets forth, among other things, on-shift facility licensee responsibilities for emergency response and delineates the standard emergency classification and action level scheme in use by the licensee (in accordance with 10 CFR 50.47(b)(4)). Section 9.1 of the SSREP states, in part, that "Upon the recognition of abnormal station conditions either through initiation of the emergency operating procedures or other sources of information, the condition will be classified in accordance with the method described in Section 5.0." Section 5.0 basically states that Seabrook uses the EAL scheme as put forth in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." The licensee's EALs are contained in ER 1.1, Classification of Emergencies. EAL 18a.3 in ER 1.1 states "A release of toxic or flammable gas from anywhere near site or onsite that may adversely impact normal station operations." The bases for that EAL states that this "concerns releases that result in concentrations within the site boundary that may affect the health of station personnel or present a threat to station property." Contrary to the above, on November 10, 2003, Seabrook did not follow the SSREP Section 9.1 in that upon recognition at 8:30 a.m. of having a flammable concentration of hydrogen gas in an area within the turbine building, an Unusual Event was not declared. The classification/declaration was not timely and eventually was made at 9:08 a.m. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program (Condition Reports 03-10142 and 03-10149), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. (NCV 50-443/2003-06-03, Untimely Declaration of an Unusual Event caused by a Flammable Concentration of Hydrogen in the Turbine Building).

4OA4 Cross Cutting Aspects of Findings

Cross-references to Human Performance Findings

Section 1R14 describes a human performance error in that operators failed to implement the requirements of the abnormal operating procedure for high turbine vibrations.

Section 1R20 describes a human performance error in that operators failed to implement the requirements in the RCS drain to mid-loop procedure.

Section 4OA3 describes a human performance error in that operators failed to timely classify an emergency event in accordance with procedures.

4OA5 Other Activities

a. Inspection Scope

1. Reactor Containment Sump Inspection (TI 2515/153 - 1 Sample)

The inspectors examined Seabrook's response to NRC Bulletin 2003-01, “Potential Impact of Debris Blockage on Emergency Sump Recirculating at Pressurized Water Reactors (PWRs)” and their implementation of compensatory measures taken to reduce the potential risk of ECCS degradation during recirculation mode.

The inspectors reviewed various changes in the emergency operating procedures including actions to improve ECCS monitoring, to provide alternate water sources, and to fully use existing water supplies. The inspectors verified that the procedure changes were included in periodic operator training and interviewed operators to assess the effectiveness of the training.

The inspectors conducted several containment walkdowns and reviewed Seabrook procedures for containment closeout. The inspectors examined a sample of Seabrook's evaluations for equipment remaining in containment. The inspectors also evaluated Seabrook response to GL 98-04 and applicable procedures and records for coatings used inside containment.

The inspectors evaluated the as found conditions of the reactor containment sump. The inspectors also reviewed the associated documents including Seabrook's engineering evaluation, surveillance procedures, and acceptance criteria for the screen mesh. The inspectors reviewed several condition reports to ensure that NRC and licensee identified issues were appropriately captured in condition reports.

Answers to TI Questions

a. Was a containment walkdown to quantify potential debris sources conducted by the licensee during the refueling outage? Yes.

b. Not applicable.

c. Not applicable.

d. Did the walkdowns conducted check for gaps in the sumps' screened flowpath for major obstructions in containment upstream of the sumps? Yes.

e. Are any advanced preparations being made at the present time to expedite the performance of sump-related modifications, in case it is found to be necessary after performing the sump evaluation? No.

b. Findings

No findings of significance were identified.

2. TI 2515/152 - Reactor Pressure Vessel (RPV) Lower Head Penetration (LHP) Nozzles (NRC BULLETIN 2003-02 - 1 sample)

a. Inspection Scope

The inspectors reviewed Seabrook's response to NRC Bulletin 2003-02 which describes RPV lower head penetration inspection program. The inspectors reviewed the LHP nozzle examination procedure to determine whether it provided adequate guidance and examination criteria to implement the licensee's examination plan. The inspectors interviewed examination personnel, reviewed training and qualification records to verify the licensee personnel qualification process adequately prepared the assigned staff to perform the examination, plus disposition and resolve deficiencies identified.

The inspectors observed Seabrook's inspection activities to verify proper performance of the procedure. The inspectors also reviewed photographs, examination reports and chemical analysis of deposits to verify procedure implementation was effective for detection of leakage from the RPV and LHP nozzles and/or corrosion of the lower head.

The inspectors selected six penetration nozzles to evaluate the effectiveness of the visual (VT) examination to verify that the penetration intersection location could be fully accessed to reliably perform a 360 degree examination of the intersection region. The inspectors verified by observation and review of photographs that the RPV lower head was free of dirt, debris, insulation, significant oxidation and any material that could adversely affect viewing of all penetrations (360 degrees around the circumference of the nozzles) and the vessel head in its entirety. The inspectors observed boron deposits on the lower head and reviewed Seabrook's evaluation that the origin of the deposits was from a location above the lower head (cavity seal ring).

The inspectors verified that the procedure used for the inspection provided adequate guidance for the recording, evaluation and documentation of the disposition of discrepancies identified during the examination.

Reporting Requirements

a.1. The examination was performed by qualified and knowledgeable personnel with certification to the American Society of Mechanical Engineers (ASME), Section XI, Level II and Level III for visual examiners. In addition, Level II and Level III examiners had received a minimum period of training in this type of inspection. The training included a review of the penetration drawings, inspection techniques and use of visual aids, effects of surface conditions on detecting and evaluating indications, industry experiences, lessons learned, inspection results and procedure requirements.

a.2. The examination was performed using adequate procedures. The procedure specified the extent of the inspections required, provided detailed documentation requirements and provided clear inspection standards and acceptance criteria on which personnel were trained.

a.3. The examination was adequate to identify, resolve, and disposition deficiencies.

a.4. The examination performed was capable of identifying pressure boundary leakage and/or lower head corrosion described in the bulletin.

b. The reactor vessel lower head was free of dirt, debris, insulation, significant oxidation and any foreign material that could adversely affect viewing of the penetrations. No boric acid deposits were identified at the interface between the vessel and the penetrations.

c. The inspection was conducted by direct visual inspection by examination personnel and by the use of a video camera. The inspection effort achieved examination for 360 degrees around the circumference of all nozzles and the vessel bottom head in its entirety.

d. If present, small boric acid deposits representing reactor coolant leakage, as described in Bulletin 2003-02, could be identified and characterized.

e. No material deficiencies were identified. No indications were identified at the time this inspection was performed.

f. Selected insulation panels were removed to facilitate the visual inspection of the bottom head penetrations. There were no impediments to the performance of the visual examination.

g. The licensee performed appropriate follow-on examinations to identify the source of dried boric acid deposits which emanated from locations above the reactor pressure vessel lower head.The licensee took samples of dried deposits from the lower vessel head for chemical analysis. The licensee performed gamma spectroscopy for age determination. The analysis determined Co-60 as the only quantified isotope. The analysis results indicated several marker nuclides were not present. Those nuclides were Co-58, Cs-134, and Cs-137. The lack of Co-58 indicates there is no current leakage and the absence of Cs-137 indicates the deposit developed before 1996.

h. The lower vessel head will be cleaned of boric acid trails and the areas examined for evidence of metal degradation.

i. The licensee concluded that the boric acid trails originated from leakage at the cavity seal ring. This conclusion was based on examination of possible leakage sources above the vessel bottom including the previous analysis and identified cavity seal ring leakage prior to the installation of a permanent cavity seal ring. Also, chemical analysis of the deposits enabled an estimate that the age of the deposits was approximately seven years old. Based on the observations made by the inspector, interviews with examiners and review of pertinent data, the licensee conclusions appear reasonable.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

Exit Meeting Summary

The inspectors presented the inspection results to Mr. G. St. Pierre on January 15, 2003, following the conclusion of the period. The licensee acknowledged the findings presented. The licensee did not indicate that any of the information presented at the exit meeting was proprietary.

Site Management Visit

On November 3 to 6, Mr. Brian McDermott, Chief, Projects Branch 6, toured the site and met with Mr. Mark Warner and other members of licensee management.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
P. Allen, Health Physics Technicians
M. Bianco, Rad Waste Supervisor
W. Cash, Health Physics Department Manager
T. Cassidy, Simulator/Support Supervisor
M. Feeney, Instrumentation & Control Supervisor
P. Freeman, Engineering Director
J. Giarrusso, Security Manager
D. Hallene, Electrical Maintenance Supervisor
D. Hampton, Health Physics Supervisor
M. Kiley, Operations Manager
M. Makowicz, Plant Engineering Manager
M. O'Keefe, Regulatory Compliance Supervisor
T. Pepin, Health Physics Supervisor
D. Perkins, Health Physics Analyst
M. Perkins, Health Physics Technician
E. Pigott, System Engineer
D. Robinson, Chemistry Manager
D. Roy, Nuclear Training Manager
D. Sherwin, Maintenance Manager
E. Spader, Operations Continuing Training Supervisor
G. St. Pierre, Station Director
R. Sterritt, Rad Technical Specialist - ALARA

R. Thurlow, Health Physics Technical Supervisor

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-443/2003-006-01	NCV	Failure to Implement Turbine Vibration Abnormal Operating Procedure (Section 1R14)
50-443/2003-006-02	NCV	Failure to Properly Implement Procedure for RCS Draining to Mid-loop (Section 1R20)
50-443/2003-006-03	NCV	Untimely Declaration of an Unusual Event caused by a Flammable Concentration of Hydrogen in the Turbine Building (Section 4OA3)

Closed

50-443/2003-01	LER	Non-Compliance with the Requirements of Technical Specification 3.8.1.1 action b. (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Documents

OS1013.05, “RHR Train A Shutdown,” Rev. 08
OS1013.03, “RHR Train A Startup and Operation,” Rev. 11
OS1014.02, “Operation of Spent Fuel Pool Cooling and Purification System,” Rev. 07
OS1014.01, “Spent Fuel Cleanup and Cooling System Fill and Vent,” Rev. 06
OS1000.13, “Operation with the Reactor Defueled,” Rev. 02
OS1215.07, “Loss of Spent Fuel Pool Cooling or Level,” Rev. 06
Applicable Piping and Instrumentation Drawings

Section 1R08: In-service Inspections

NDE Examination Test Reports

03-02-010, Liquid Penetrant Examination of Pipe to Tee Weld, Core Spray
03-02-009, Liquid Penetrant Examination of Valve V123 to Pipe Weld, Core Spray
03-01-012, Ultrasonic Test Report of FW4607-03 02, Feedwater, System

03-03-002, Magnetic Particle Examination, Feedwater Flow Nozzle-Pipe 4607-03 02
03-03-001, Magnetic Particle Examination, Feedwater Flow Nozzle-Pipe 4607-03-01
1-RC-E-1, Reactor Vessel CRDM Nozzle Visual Inspection
03-01-014, Ultrasonic Test Report of MS4001-02 05, Main Steam Pen X-2 to Pipe
03-01-017, Ultrasonic Test Report of MS4002-02 05, Main Steam Pen X-3 to Pipe
03-01-011, Ultrasonic Test Report of FW 4607-03 01, Feedwater System

<u>NDE Examination Procedures</u>

ES03-01-21, "PDI Procedure for the Ultrasonic Examination of Ferritic Pipe Welds," Rev. 0
ES03-01-22, "PDI Procedure for the Ultrasonic Examination of Austenitic Pipe Welds," Rev. 0
ES1807.002, "Liquid Penetrant Examination-Solvent Removable," Rev. 5
ES1807.003, "Magnetic Particle Examination, Dry," Rev. 5
ES1807.033, "Radiographic Examination (RT) Procedure," Rev. 1
ES00-1-30, "Visual Inspection of Plugs (Steam Generator Tube," Rev. 1
ES1807.037, "Visual Examination Procedure for BMI Inspection," Rev. 0
ES1807.037, "Visual Examination Procedure for BMI Inspection," Rev. 0

<u>Radiographic Examination Report</u>

FW001 Main Steam Weld F001
FW001(R1) Main Steam Repair of Field Weld 001
FW002 Main Steam Weld F002

<u>Repair-Replacement Work Order</u>

03 DCR 013 Conoseal Seal Clamp Assembly Addition to CRDM Housings
01W003103 Replacement of Valve MS-V-394

<u>Drawings/Isometrics</u>

1-NHY-202397ISI ISI Isometric Feedwater System
1-NHY-800327ISI ISI Isometric Charging System
1448E83 Closure Head General Assembly

<u>Miscellaneous</u>

Primary Containment Inservice Inspection Program Plan-First Interval
Condition Monitoring Assessment and Final Operational Assessment OR08
Steam Generator Management Reference
STA-707 50.59 Screen, Conoseal Seal Clamp Assembly
Ultrasonic, Magnetic Particle and Liquid Penetrant Examiner (Various) Qualifications
Work Order 0333841, Inspect, Remove Insulation, and Clean Head and CRDM Nozzles
Work Order 0313321, Perform Visual Inspection of Bottom Mounted Penetrations
ES0815.004, Rev 00 Chg 05, Welding of Carbon Steel Materials (P1 to P1)
Weld Procedure YA-WP-27&YA-WP-5, GTAW of P1to P1 Materials
Weld Procedure YA-WP-3, GTAW and SMAW Welding of P1 to P1 Materials

Section 1R20: Refueling and Outage Activities

Procedures

OS1000.02, “Plant Startup from Hot Standby to Minimum Load,” Rev. 7
OS1000.03, "Plant Shutdown from Minimum Load to Hot Standby," Rev. 5
OS1000.04, "Plant Cooldown from Hot Standby to Cold Shutdown," Rev. 8
OS1000.05, “Power Increase,” Rev. 5
OS1000.07, “Approach to Criticality,” Rev. 5
OS1000.09, “Refueling Operation," Rev. 6
OS1000.12, "Operation with RCS at Reduced Inventory/Midloop Conditions," Rev. 4
OS1000.14, "Reactor Coolant System Evacuation and Fill," Rev. 5
OS1000.15, “Refueling Outage Cooldown,” Rev. 1
OS1056.03, "Containment Penetrations," Rev. 1
OS1401.12, "Reduced Inventory Containment Verification," Rev. 3
OS1213.01, "Loss of RHR during Shutdown Cooling," Rev. 10
OS1213.02, "Loss of RHR while operating at Reduced Inventory/Mid-loop Conditions," Rev. 7

Miscellaneous Documents

Clearances for "A" Service Water, "A" Emergency Diesel Generator, and "A" RHR.
GL 88-17, "Loss of Decay Heat Removal" and Seabrook's response to GL 88-17

Section 2OS2: ALARA Planning and Controls

Procedures

HD0958.27, "Dose Assessment for Personnel Contamination," Rev. 22
HD0958.49, "Response Protocols for Whole Body Counting and Personnel Contamination Monitoring," Rev. 0
HD0961.29, "Internal Dosimetry Assessment," Rev. 23
HD0961.31, "Canberra Whole Body Counting System Operation," Rev. 2
HD0961.34, "Canberra FASTSCAN Whole Body Counting System Operation," Rev. 0
CS0908.01, "Off-site Dose Assessment," Rev. 13
CS0917.01, "Liquid Effluent Releases," Rev. 15
CS0917.02, "Gaseous Effluent Releases," Rev. 10
CS0917.03, "Unmonitored Plant Releases," Rev. 7
SM 7.7, "Evaluation of Potential Radiological Release Pathways," Rev. 2
JD0999.910, "Reporting Key Performance Indicators Per NEI 99-02," Rev. 0
RP 2.1, "General Radiation Worker Instruction and Responsibilities," Rev. 17
RP 9.1, "RCA Access/Egress Requirements," Rev. 19
RP 15.1, "Job Pre-Planning and Review for Radiation Exposure Control," Rev. 17
RP 15.2, "ALARA Recommendations," Rev. 9
RP 15.4, "Use and Control of Temporary Shielding," Rev. 10
RP 15.5, "Exposure Control," Rev. 3

ALARA Reviews

AR 03-02, "OR09 Reactor Vessel Disassembly & Reassembly," Rev. 0
AR 03-03, "OR09 Steam Generator Eddy Current Testing & Tube Plugging," Rev. 0
AR 03-04, "OR09 Steam Generator Secondary Side Maintenance & Inspections," Rev. 0
AR 03-07, "OR09 MOV Testing/Preventive Maintenance & Repair," Rev. 0
AR 03-16, "OR09 Reactor Vessel CRDM Conoseal Seal Leak Repair," Rev. 1

Nuclear Assurance Quality Reports

03-0124, Radiological Surveys (Electronic)
03-0153, ALARA Preparations for the Outage
03-0154, Pre-Outage Training for Health Physics Contractors
Seabrook Daily Quality Summary, October 21 & 23, 2003

Condition Reports

Effluent Related: 03-05688, 03-04901, 03-05163, 03-08310
ALARA Related: 03-09298, 03-09251, 03-09226, 03-08755, 03-08711, 03-08594, 03-08457, 03-08334, 03-08155, 03-09251, 03-01873, 03-00905, 03-00658, 02-14791, 02-14855, 02-15604, 02-16442

Radiation Safety Committee Meeting Minutes

Meeting No. 03-01, 03/19/2003
Meeting No. 03-02, 06/09/2003
Meeting No. 03-03, 08/07/2003

Section 4OA2: Identification and Resolution of Problems

Procedures

MS0539.37, "Emergency Diesel Generator Engine Cylinder Head Maintenance," Rev. 0
MX0539.42, "Emergency Diesel Generator Post Maintenance Testing (Power Cylinder Run In)," Rev. 3
MX0539.37, "Emergency Diesel Generator Engine Cylinder Maintenance," Rev. 1
MX0539.63, "Emergency Diesel Generator Exhaust Valve Removal, Replacement and Belleville Washer Replacement," Rev. 0
MX0539.42, "Emergency Diesel Generator Post Maintenance Testing (Power Cylinder Run In)," Rev. 3
MS0539.51, "DG 1A Lube Oil System Draining, Filling, and Venting," Rev. 0
MS0539.52, "DG 1B Lube Oil System Draining, Filling, and Venting," Rev. 0
Preventive Maintenance Task 1-DG-SKD-7-A-M3-000, A EDG Exhaust Valve Maintenance, Data Sheet dated November 18, 2003

Work Orders

Work Order (WO) 0326067, B EDG - Perform Exhaust Valve Retaining Nut Belleville Washer Replacement
WO 0323250, Replace Exhaust Valve Belleville Washers on the A EDG
WO 0320197, A EDG - Perform Exhaust Valve Retaining Nut Torque, Belleville Washer Configuration and Condition
WO 0321090, B EDG - Perform Exhaust Valve Retaining Nut Belleville Washer Inspection
WO 0231200, A EDG - Exhaust Valves Preventive Maintenance

Miscellaneous

Technical Manual C470-1, Vols. I, II & III, Operation and Maintenance Manual, Public Service Company of New Hampshire, Seabrook Station, Seabrook, New Hampshire, Emergency Diesel Generator Systems, Colt-11-206086
BV LNS 185 05043, Range LNS Operating and Maintenance Instructions for Liestritz Screw Pumps, 1981
Drawing, PID-1-DG-B20458, Diesel Generator Lube Oil System Train “A” Detail
Drawing, PID-1-DG-B20463, Diesel Generator Lube Oil System Train “B” Detail
Foreign Print (FP) 20590-14, Lube Oil System Schematic, 3 Sheets
Maintenance Support Evaluation (MSE) 03MSE160, EDG Engine Driven Lube Oil Pump Discharge Check Valve - Disc By-Pass Orifice, 1-DG-V-23-A & 1-DG-V-23-B
Design Calculation C-S-1-25117, Orifice Sizing for EDG Engine Driven Lube Oil Pump Check Valve - Disc By-Pass Orifice, 1-DG-V-23-A, 1-DG-V-23-B, Rev. 0, dated August 19, 2003
Root Cause Analysis (RCA), CR 03-05007, Diesel Generator 1A Belleville Washer Failure,
RCA, CR 03-05105, DG-1A Trip on Low Lube Oil Pressure
CR 03-01297, Plant Engineering Aggregate Assessment of EDGs Past 5 Year Performance
Leistritz Inspection Report, Pump Serial 31308.002, dated July 16, 2003

Condition Reports

CR 03-06043, Significance Level B, Ability to Perform Meaningful Failure Analysis on 1A EDG Main Lube Oil Pump Was Lost During Onsite Disassembly During Work Order (WO) 0320258
CR 03-05734, Seabrook Practices for Torquing Belleville Washers Differs from OEM Practices
CR 02-04829, EDG Engine-driven Lube Oil Pump Relief Valve May be Lifting During Engine Operations
CR 02-05315, A EDG Auxiliary Lube Oil Pump Started Unexpectedly During EDG Maintenance Run
CR 02-16349, Seabrook Should Formally Adopt Fairbanks Morse Owners Group Maintenance Recommendations in place of Vendor Manual Recommendations
CR 03-05189, Consider a Drilled Orifice or Removal of the EDG Attached Lube Oil Pump Discharge Check Valve
CR 03-06043, RCA Hampered by Failure to Quarantine Failed A EDG Lube Oil Pump
CR 03-10354, Are Changes Entered Into the Procedure Tracking Database Adequately Screened to Determine If a Procedure Hold is Required Pending Change Completion
CR 03-10355, Contrary to Vendor Manual the A EDG Attached Lube Oil Pump is Operating as a Pressure Regulating Valve Versus a Pressure Relief Valve

Section 4OA3: Event Followup

Procedures and other Documentation

OS1201.02, “RCS Leak," Rev. 10
RP 9.2, "Radiological Access Requirements to Containment Areas," Rev. 8
RP 15.1, "Job Preplanning and Review for Radiation Exposure Control," Rev. 17
WO 0224574 Leak from Transmitter Low Side Vent
Memorandum on Loop Entry at Power for RC-FT-434 Leak Isolation

Section 4OA5: Other Activities

Procedures and other Documentation

ES1.2, "Post LOCA Cooldown and Depressurization," Rev. 28
ES1.3, "Transfer to Cold Leg Recirculation," Rev. 20
ECA1.1, "Loss of Emergency Coolant Recirculation," Rev. 27
HD0958.34, "Health Physics Containment Closeout," Rev. 2
OS1015.18, "Setting Containment Integrity for Mode IV Entry," Rev. 5
MS0517.23 Service Level 1 Coating GL 98-04, Rev. 5
OX1406.12, "18 Month Containment and Containment Spray Recirculation Sump Surveillance," Rev. 5
EE-03029, "Evaluation of ECCS Containment Recirculation Sump Debris for OR09," Rev. 0
Scaffold & Temporary Equipment Engineering Evaluation, 03-013, 03-012, 02-002, 97-333
C-S-1-11029, "Inventory of Unqualified Coatings Applied in Containment Building," Rev. 0
Conditions Report 0100320,
UFSAR 6.2.2.2j, "Containment Systems," Rev. 9
GSI-191, "Technical Assessment: Parametric Evaluations for Pressurized Water Reactor Recirculation Sump Performance"
NEI 02-01, "Conditions Assessment Guidelines: Debris Sources Inside PWR Containment," Rev. 1
NRC BL 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactor"
TI 2515/153, "Reactor Containment Sump Blockage (NRC BL 2003-01)"

Condition Report

CR 03-08473 Indication of Boron After Removal of Mirror Insulation
CR 00-12839 Moisture Barrier at 26' Elevation is Damaged
CR 02-07811 Areas Identified on Elevation 26' With Light Surface Corrosion
CR 00-12320 Debris on Top of Moisture Barrier
CR 03-08734 Boric Acid Trails Noted on Vessel Bottom
CR 03-08985 Second Potential Leaking CRDM Penetration
CR 03-08518 Leakage Noted at CRDM Penetration No. 26
CR 03-08440 Tape Residue Discovered on Vessel Bottom and Penetrations

LIST OF ACRONYMS

ACE	Apparent Cause Evaluation
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Is Reasonably Achievable
AOP	Abnormal Operating Procedure
CAP	Corrective Action Program
CEVA	Containment Enclosure Emergency Exhaust Filter System
CFR	Code of Federal Regulations
CR	Condition Report
CRDM	Control Rod Drive Mechanism
CS	Core Spray
ECT	Eddy Current Testing
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
EPRI	Electrical Power Research Institute
FW	Feedwater
FWIV	Feedwater Isolation Valves
ISI	In-Service Inspection
JPM	Job Performance Measures
LHP	Lower Head Penetration
MS	Main Steam
NEI	Nuclear Energy Institute
NCV	Non-Cited Violation
NDE	Nondestructive Examination
NRC	Nuclear Regulatory Commission
NSO	Non-licensed Operator
OD	Operability Determination
OS	Operating System
PMT	Post-Maintenance Test
PORV	Power Operated Relief Valves
RCA	Radiologically Controlled Area
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RWP	Radiation Work Permit
SDP	Significance Determination Process
SSREP	Seabrook Station Radiological Emergency Plan
TI	Temporary Instruction
TS	Technical Specifications
TSR	Temporary Shielding Requests
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Test
VT	Visual Testing
WD	Work Document