UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4005

July 6, 2004

Joseph E. Venable
Vice President Operations
Waterford Steam Electric Station Unit 3
Entergy Operations, Inc.
17265 River Road
Killona, Louisiana 70066-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000382/2004006

Dear Mr. Venable:

On May 21, 2004, the NRC completed an inspection at your Waterford Steam Electric Station, Unit 3. The enclosed report documents the inspection findings, which were discussed on May 21, 2004, with you and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

The team reviewed approximately 135 corrective action program documents, apparent and root cause analyses and plant procedures for the identification and resolution of problems. Based on this review, the team found that your processes to identify, prioritize, evaluate, and correct problems were generally effective; thresholds for identifying issues remained appropriately low and, in most cases, corrective actions were adequate to address conditions adverse to quality. However, a number of issues were identified associated with the proper identification, evaluation and correction of degraded conditions in the plant. Most of these issues were identified when the team reviewed corrective actions associated with longstanding degraded conditions and design issues at Waterford 3, which had cross-cutting aspects in the area of problem identification and resolution.

This report documents three findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that violations were associated with these findings. The violations are being treated as noncited violations consistent with Section VI.A of the Enforcement Policy. If you contest the violations or significance of these noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3 facility.

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

Sincerely,

//RA//

Linda Joy Smith, Chief
Plant Engineering Branch
Division of Reactor Safety

Docket: 50-382
License: NPF-38

Enclosure:
NRC Inspection Report
05000382/2004006
W/attachment: Supplemental Information

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	50-382
License:	NPF-38
Report:	05000382/2004006
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	Hwy. 18 Killona, Louisiana
Dates:	May 3 through May 21, 2004
Inspectors:	P. Alter, Senior Resident Inspector, Projects Branch B P. Goldberg, Reactor Inspector, Plant Engineering Branch G. Replogle, Senior Resident Inspector, Projects Branch E M. Hay, Senior Resident Inspector, Projects Branch E G. Larkin, Resident Inspector, Projects Branch E
Approved by:	L. J. Smith, Chief Plant Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000382/2004006; 05/03 - 21/2004 ; Waterford Steam Electric Station, Unit 3. Identification and Resolution of Problems, Mitigating Systems, Barrier Integrity

The inspection was conducted by three senior resident inspectors, one reactor inspector, and one resident inspector. Three green findings of very low safety significance were identified during the inspection and were classified as noncited violations. The significance of most findings is indicated by their color (green, white, yellow, red) using IMC 0609, "Significance Determination Process." Findings for which the significant determination process does not apply may be "green" or 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.

Identification and Resolution of Problems

- The team reviewed approximately 135 corrective action program documents, apparent and root cause analyses and plant procedures for the identification and resolution of problems. Based on this review, the team found that the licensee's process to identify, prioritize, evaluate, and correct problems was generally effective; thresholds for identifying issues remained appropriately low and, in most cases, corrective actions were adequate to address conditions adverse to quality. However, a number of issues were identified associated with the proper identification, evaluation and correction of degraded conditions in the plant. Most of these issues were identified when the team reviewed corrective actions associated with longstanding degraded conditions and design issues at Waterford 3, which had cross-cutting aspects in the area of problem identification and resolution.

  The team concluded that a positive safety-conscience work environment exists at Waterford 3. The team determined that employees and contractors feel free to raise safety concerns to their supervision or bring concerns to the employees concern program.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a 10 CFR 50, Appendix B, Criterion XVI, noncited violation for situations where the licensee failed to promptly correct conditions adverse to quality associated with the main feed isolation valve hydraulic actuating systems. In two cases, the licensee failed to promptly correct instances where the hydraulic actuator thermal relief valves failed to properly function. Consequently, the hydraulic portion of the valve actuator experienced repetitive over-pressure conditions. In one case, the licensee failed to properly address system operability and, for a two-week period, actual valve operability was unknown.

The issue was more than minor because it affected the mitigating systems cornerstone objective to ensure the availability of systems that respond to initiating events. The finding was determined to be of very low risk significance because each issue: was not a design or qualification deficiency; did not result in the loss of a safety system; did not represent an actual loss of a safety function of a single train for greater than its technical specification allowed outage time; did not represent an actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and was not potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event. Because the failure to promptly identify and correct the over-pressure condition was of very low safety significance and has been entered into the licensee's corrective action program as condition reports CR-WF3-2004-1533, 1540 and 1551, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (Section 4OA2 e.).

Cornerstone: Barrier Integrity

- Green. The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion XVI, for the failure to promptly identify and correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to identify and correct an inappropriate value of the unfiltered inleakage parameter used to calculate the control room operator dose for design basis accident conditions involving radiological releases. This failure resulted in significantly underestimating the actual dose to operators.

  This finding was greater than minor because it affected the barrier integrity cornerstone objective related to design control of the control room envelope and was determined to be of very low safety significance because the deficiency only affected the radiological barrier function provided for the control room. Because the failure to promptly identify and correct the analysis was of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-WF3-2004-1403, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (Section 4OA2 e.).

- Green. The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion XVI, for the failure to promptly identify and correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to correct a known deficient condition involving the failure to account for instrument uncertainty to satisfy Technical Specification Surveillance Requirement 4.7.6.5.a. This failure potentially affects the ability of the control room envelope to perform its design function with respect to protecting operators from postulated design basis accidents resulting in radiological releases.

  This finding was greater than minor because it affected the barrier integrity cornerstone objective related to maintaining the barrier function of the control room envelope. The finding was determined to be of very low safety significance because the deficiency only affected the radiological barrier function provided for the control room. Because the failure to promptly identify and correct the analysis was of very low safety significance and has been entered into the licensee's corrective action program as condition report CR-WF3-2004-1561, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (Section 4OA2 e.).

B. Licensee-Identified Violations

None.

REPORT DETAILS

4 OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

a. Effectiveness of Problem Identification

(1) Inspection Scope

The inspectors reviewed items selected across the seven cornerstones to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. Specifically, the team's review included a selection of approximately 135 condition reports. The majority were opened or closed since the last NRC Problem Identification and Resolution Inspection completed on December 20, 2002. The team also performed a historical review of condition reports written over the last five years for the high pressure safety injection system, emergency feedwater system, safety-related battery chargers and the emergency diesel generators. The team reviewed a sample of licensee audits and self assessments, trending reports, system health reports, and various other reports and documents related to the problem identification and resolution program. The audit and self-assessment results were compared with the self-revealing and NRC-identified issues to determine the effectiveness of the audits and self assessments.

The team interviewed station personnel and evaluated corrective action documentation to determine the licensee's threshold for identifying problems and entering them into the corrective action program. The team attended morning work planning and work request classification meetings to evaluate the licensee's evaluation of plant issues against corrective action program criteria for condition report initiation. The team evaluated the licensee's efforts in establishing the scope of problems by reviewing control room operator logs, security and radiation protection logs and work orders (formerly maintenance action items).

In addition, the team reviewed the licensee's evaluation of selected industry experience information, including operator event reports and NRC and generic vendor notices, to assess if issues applicable to Waterford 3 were appropriately addressed.

A listing of specific documents reviewed during the inspection is included in the attachment to this report.

(2) Assessment

The team determined that, in general, problems were adequately identified and entered into the corrective action program. The threshold for entering issues into the corrective action program was appropriately low. Conditions adverse to quality identified in other systems, such as the work management system and various logs were properly entered into the licensee's corrective action program.

However, the team found one example of ineffective problem identification during this inspection. One example of ineffective problem identification was identified during a previous inspection. These conditions related to a long-standing design issue for Waterford 3.

Example 1 - Noncited Violation 05000382/2004006-01: Failure to Promptly Identify Inappropriate Assumption and Correct Control Room Operator Dose Analysis

The team determined problem identification was not adequate based on the number of opportunities the licensee had to identify the inappropriate assumptions beginning from the design change that was made in 1983. The licensee had additional opportunities to identify this design deficiency when revisions to the dose calculation were performed (1994 and 1998) that actually included changes to the assumed leakage values. In March 2004, the licensee identified that the dose analysis for operators in the control room during a radiological emergency assumed that the control room was in the pressurized mode contrary to design basis documents. (This issue is discussed in more detail in Report Section 4OA2 e.)

Example 2 - Noncited Violation 05000382/2003006-04: Inadequate Design Control of Switchgear Ventilation System.

NRC inspection report 05000382/2003006 documented a design control violation with cross-cutting aspects related to inadequate problem identification. The licensee missed two prior opportunities to identify the need to correct their design for the of the switchgear ventilation system. The February 2, 1989 problem evaluation and information request Number 10672, failed to determine the basis for the safety-related position of inlet Dampers SVS-101 and 102. The 1997 design basis reconstitution process Item SVS-01-058 did not determine the basis for the normal and safety-related position of the inlet dampers. Yet Final Safety Analysis Report Section 6.4.2.4 states, in part, that the ventilation zones adjacent to the control room are to be maintained “always negative with respect to the [control room] envelope.” The switchgear ventilation zone is adjacent to the main control room.

b. <u>Prioritization and Evaluation of Issues</u>

(1) <u>Inspection Scope</u>

The team reviewed condition reports, engineering operability evaluations and operations operability determinations to assess the licensee’s ability to evaluate the importance of the conditions adverse to quality. The team reviewed the results of corrective action review group meetings that assigned significance and priority to condition reports. The team reviewed a sample of failure mode analyses, apparent cause analyses and root cause analyses, to ascertain whether the licensee identified and considered the full extent of conditions, generic implications, common causes, and previous occurrences. The team also observed management oversight of the significant conditions adverse to quality including one Corrective Action Review Board meeting.

In addition, the inspectors reviewed licensee evaluations of selected industry operating experience information, including operating event reports and NRC and generic vendor notices, to assess whether issues applicable to Waterford 3 were appropriately addressed. The team performed a historical review of condition reports covering the last five years regarding the high pressure safety injection system, the emergency feedwater system, safety-related battery chargers and the emergency diesel generators to determine if the licensee had appropriately addressed long-standing issues and those that might be age dependent.

A listing of specific documents reviewed during the inspection is included in the attachment to this report.

(2) Assessment

The team concluded that problems were generally prioritized and evaluated in accordance with the licensee's corrective action program guidance and NRC requirements. The team found that for the sample of root cause analyses reviewed, that the licensee was generally self critical and exhaustive in its research onto the history of significant conditions adverse to quality.

However, the team found two examples of ineffective problem evaluation during this inspection. One example of ineffective problem evaluation was identified during a previous inspection. In two cases, the condition related to a long-standing design issue for Waterford 3.

Example 1 - Noncited Violation 05000382/2004006-02: Failure to Promptly Correct Over-pressure Condition in Main Feed Water Isolation Valve Hydraulic Operating Systems.

The team determined that the licensee failed to effectively evaluate operability of a main feed water isolation valve following the February 20, 2004 hydraulic operating system over-pressure condition. The licensee stated that accumulator pressure was reduced therefore Valve FW-184B was operable. However, the operability assessment did not address the potential for the system to over-pressurize again. As a result, the licensee did not start additional monitoring of hydraulic pressure until March 4, 2004 and then only on an infrequent basis. (This issue is discussed in more detail in Report Section 4OA2 e.)

Example 2 - Noncited Violation 05000382/2004006-03: Failure to Promptly Identify and Correct a Known Deficient Condition Involving the Failure to Account for Instrument Uncertainty to Satisfy Technical Specification Surveillance Requirement 4.7.6.5.a.

The team determined that the licensee failed to effectively evaluate regulatory requirements. On two occasions this issue was entered into the corrective action process, with two different reasons as to why the issue was acceptable to not take any corrective actions. The team noted that in response to condition report CR-WF3-1998-1439, the licensee determined instrument uncertainty was not required to be considered for this application because the instrument was not significant to safety. In response to condition report CR-WF3-2003-2115, the licensee determined the intent of the surveillance was to demonstrate that leakage would be less than 200 standard cubic feet per minute and since the instrument uncertainty was less than 0.125 inches water gauge the intent of the surveillance requirement was satisfied. As a result the instrument uncertainty for the differential pressure instrumentation was not taken into account during periodic testing for Surveillance Requirement 4.7.6.5.a. (This issue is discussed in more detail in Report Section 4OA2 e.)

Example 3 - Noncited Violation 05000382/2003006-02: Inadequate Design Control of the Diesel Generator Starting Air System.

NRC inspection report 05000382/2003006 documented a design control violation with cross-cutting aspects related to inadequate problem evaluation. The licensee failed to effectively evaluate a deficiency related to the design of the emergency diesel generator. The licensee incorrectly determined that the five start capability of the emergency diesel starting air receivers was only a sizing criterion for the receivers and that maintaining receiver pressure greater than the original test pressure was not required for system operability. As a result of this inadequate evaluation, the receiver air pressure was not always maintained above the original minimum test pressure.

c. Effectiveness of Corrective Actions

(1) Inspection Scope

The team reviewed approximately 135 condition reports to verify that corrective actions related to the issues were identified and implemented in a timely manner commensurate with safety, including corrective actions to address common cause or generic concerns. The team reviewed corrective actions planned and implemented by the licensee and sampled specific technical issues to determine whether adequate decisions related to structure, system, and component operability were made.

In addition, the team reviewed a sample of those condition reports written to address NRC inspection findings to ensure that the corrective actions adequately address the issues as described in the inspection report writeups. The team also reviewed a sample of corrective actions closed to other condition reports and programs, such as work requests and engineering work requests, to ensure that the condition described was adequately addressed and corrected.

A listing of specific documents reviewed during the inspection is included in the attachment to this report.

(2) Assessment

The team evaluated several occurrences where the licensee did not effectively address conditions adverse to quality and corrective actions taken were timely and appropriate. These included two examples, identified by the team, where the licensee failed to take prompt corrective actions to resolve long-standing issues. The team also evaluated six other findings, identified by the NRC baseline inspection program at Waterford 3, since the last problem identification and resolution inspection that had cross cutting aspects related to prompt and effective corrective actions to resolve conditions adverse to quality.

Example 1 - Noncited Violation 05000382/2004006-01: Failure to Promptly Identify Inappropriate Assumption and Correct Control Room Operator Dose Analysis

The team determined that the licensee failed to take prompt corrective actions to address a long term design deficiency. The licensee identified problems with the assumptions used to preform the control room operator dose analysis and initiated a condition report on March 9, 2004. The licensee took no immediate corrective actions to either revise the dose calculation or take required compensatory measures. The licensee determined that they would evaluate the results of the tracer gas testing scheduled for April 16, 2004 to re-evaluate the control room habitability assumptions and procedural guidance. (This issue is discussed in more detail in Report Section 4OA2 e.)

Example 2 - Noncited Violation 05000382/2004006-02: Failure to Promptly Correct Over-pressure Condition in Main Feed Water Isolation Valve Hydraulic Operating Systems

The team determined that the licensee failed to take prompt corrective actions to address hydraulic operating system over-pressure conditions. Consequently, additional problems were experienced. First, on February 10, 2001, operators found that one FW-184A hydraulic accumulator thermal relief valve had failed to relieve pressure at its 5400 psig setpoint. The as-found system pressure was 5595 psig. The licensee did not promptly correct the problem, and on February 16, 2001, operators found pressure at 6080 psig, which was above the design pressure of 5900 psig. Second, on February 20, 2004, operators found FW-184B hydraulic operating pressure at 5983 psig, which was above the design limit of 5900 psig. The licensee did not properly address operability and did not promptly identify and correct the problem. As a result, the replacement valve also failed due to the same cause (gelled hydraulic oil), and the system was over-pressurized. (This issue is discussed in more detail in Report Section 4OA2 e.)

Example 3 - Noncited Violation 05000382/2003007-03: Ineffective Corrective Actions to Prevent Recurrence of Voiding Conditions.

NRC inspection report 05000382/2003007 documented ineffective corrective actions to prevent recurrence of voiding conditions. Operators failed to take corrective actions to fill and vent the low pressure safety injection as required by condition report CR-WF3-2002-0818, which resulted in the system being inoperable on another occasion due to voiding.

Example 4 - Noncited Violation 05000382/2003007-04: Ineffective Corrective Actions to Prevent Recurrence of Primary Water Stress Corrosion Cracking of Alloy 600 Material.

NRC inspection report 05000382/2003007 documented ineffective corrective actions to prevent cracking of alloy 600 material. The licensee did not establish replacement plans for susceptible Alloy 600 nozzles and had no inspection plans other than visual examinations to find leakage during the subsequent outage.

Example 5 - Noncited Violation 05000382/2003011-04: Inadequate Corrective Actions for Identified Emergency Lighting Inadequacies.

NRC inspection report 05000382/2003011 documented inadequate corrective actions for emergency lighting inadequacies. On May 15, 2002, a special test instruction was prepared to perform a full field test of emergency lighting as a corrective action for condition report CR-WF3-2000-0665. The test was postponed twice and on July 3, 2003 the licensee performed an evaluation to justify cancellation of the test. The maintenance rule function failure determination for condition report CR-WF3-2000-1206 did not result in a proactive corrective action to address multiple emergency lighting discharge test failures.

Example 6 - Noncited Violation 05000382/2004002-01: Inadequate Corrective Actions Affecting Feedwater Isolation Valves.

NRC inspection report 05000382/2004002 documented inadequate corrective actions to address age related failures. Failure to replace feedwater isolation valve actuator O-rings that were susceptible to age related failures, as a corrective action to condition report CR-WF3-2000-0628, resulted in the inoperability of a feedwater isolation valve seven months later.

Example 7 - Noncited Violation 05000382/2004002-02: Inadequate Maintenance Instructions Affecting Main Feedwater Isolation Valve.

NRC inspection report 05000382/2004002 documented a maintenance control violation with cross-cutting aspects related to inadequate corrective actions. Condition Report CR-WF3-2002-0624 identified a need for an operating and maintenance manual for the feedwater isolation valves. A vender manual was identified, but the condition report was closed before maintenance instructions were amended to include torque specifications for the feedwater isolation valve hydraulic operating system. As a result, an O-ring failed seven days after it was replaced.

Example 8 - Noncited Violation 05000382/2004002-05: Failure to Promptly Identify and Correct Emergency Diesel Generator Loading and Fuel Oil Consumption Analysis Deficiencies.

NRC inspection report 05000382/2004002 documented a design control violation with cross-cutting aspects related to inadequate corrective actions. Condition Report CR-WF3-2003-3088, which identified that the diesel generator fuel oil consumption analysis did not properly account for three discrepancies, was closed to condition report CR-WF3-2003-2758. CR-WF3-2003-2758 was closed without revising the fuel oil consumption analysis for the deficiencies noted in CR-WF3-2003-3088.

d. Assessment of Safety-Conscience Work Environment

(1) Inspection Scope

The team interviewed more than 15 individuals from the licensee's staff, representing a cross-section of functional organizations and supervisory and non-supervisory personnel. These interviews assessed whether conditions existed that would challenge the establishment of a safety-conscience work environment. The team interviewed the site employee's concern program coordinator and noted that a separate coordinator was assigned to the contractor security force. The team also reviewed the most recent employee survey performed by the licensee to evaluate the health of the plant's safety culture and the employee's concerns program.

(2) Assessment

The team concluded that a positive safety-conscience work environment exists at Waterford 3. The team determined that employees and contractors feel free to raise safety concerns to their supervision or bring concerns to the employees concern program. The team determined that licensee management is receptive to employee concerns and is willing to address issues raised by the latest safety culture survey.

e. Specific Issues Identified During This Inspection

(1) Inspection Scope

During this assessment the team performed the inspections scoped in Sections 4OA2 a.(1), 4OA2 b.(1), 4OA2 c.(1),and 4OA2 d.(1) above.

(2) Finding Details

Noncited Violation 05000382/2004006-01: Failure to Promptly Identify Inappropriate Assumption and Correct Control Room Operator Dose Analysis

Introduction. The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion XVI, for the failure to promptly identify and correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to identify and correct an inappropriate value of the unfiltered inleakage parameter used to calculate the control room operator dose for design basis accident conditions involving radiological releases. This failure resulted in significantly underestimating the actual dose to operators.

Description. In April 2004, the licensee performed tracer gas testing of the control room envelope in response to concerns addressed in NRC Generic Letter 2003-001. Results of the tracer gas test demonstrated that assumed unfiltered inleakage values utilized by the control room operator dose calculation were exceeded for design basis accident conditions. The team reviewed the design of the control room ventilation system and noted that following a high radiation condition or safety injection actuation event the control room would automatically isolate, but would not automatically pressurize. The team noted that control room operator dose calculation, EC-S96-011, assumed 13 cfm of unfiltered inleakage. This value was assumed based on the control room being in a pressurized mode of operation. The team questioned the licensee why they believed 13 cfm would adequately model the event since the control room did not automatically pressurize as assumed by the analysis. The licensee stated the analysis was considered a bounding analysis since they had no data to indicate otherwise. The team was concerned that the analysis was not bounding since unfiltered inleakage would be higher when the control room was isolated, as compared to isolated and pressurized.

The team reviewed the licensee's original Final Safety Analysis Report and noted that the control room ventilation system was designed to automatically isolate and pressurize following a safety injection actuation signal or a control room high radiation condition. The control room dose calculation used the appropriate unfiltered inleakage assumption for this design. In 1983, the licensee changed the design of the control room ventilation system to automatically isolate following a safety injection actuation signal or a control room high radiation condition without automatic pressurization. This design change was performed without changing the unfiltered inleakage assumption for the control room dose calculation to account for a higher assumed unfiltered inleakage from adjacent areas. NUREG-0800, "Standard Review Plan," Section 6.4, specifies that unfiltered inleakage for control rooms that isolate without pressurization use an unfiltered inleakage value of one half the amount of air required to pressurize the envelope to one eighth inch water gauge. This specification required the licensee to assume approximately 100 cfm of unfiltered inleakage into the control room for the isolate mode of operation. The team noted that the control room dose calculation was revised in 1994 and 1998. Both of these revisions also failed to identify that the unfiltered inleakage criterion was inappropriate. The team determined that these were missed opportunities for the licensee to identify this deficient condition.

The team performed a review of the licensee’s corrective action database and identified that a system engineer had initiated a condition report on March 9, 2004, related to this same deficiency. Condition Report CR-WF3-2004-00725, stated, in part, that a potential adverse condition was discovered, Waterford 3's current design basis for control room habitability during a radiological emergency assumes the control room to be in the pressurized mode contrary to design basis documents. The licensee took no immediate corrective actions to either revise the dose calculation or take required compensatory measures. The licensee determined that they would evaluate the results of the tracer gas testing to re-evaluate the control room habitability assumptions and procedural guidance. The team determined that this was a missed opportunity to correct this deficient condition.

Analysis. The deficiency associated with this finding was the failure to promptly identify and correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to identify and correct an inappropriate unfiltered inleakage parameter used to calculate the control room operator dose for design basis accident conditions involving radiological releases. This failure resulted in underestimating the dose to operators following design basis accident conditions involving radiological releases. This finding was greater than minor because it affected the barrier integrity cornerstone objective related to design control of the control room envelope. This finding was evaluated using Inspection Manual Chapter 0609, “Significance Determination Process,” Phase 1 worksheet under the containment barriers cornerstone. The finding was determined to be of very low safety significance because the deficiency only affected the radiological barrier function provided for the control room.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” states, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. The failure to promptly identify and correct the use of an inappropriate unfiltered inleakage parameter affecting the control room operator dose analysis is a violation of 10 CFR 50, Appendix B, Criterion XVI. Because the failure to promptly identify and correct the analysis was of very low safety significance and has been entered into the licensee’s corrective action program as Condition Report CR-WF3-2004-1403, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy:
(NCV 05000382/2004006-01) Failure to Promptly Identify Inappropriate Assumption and Correct Control Room Operator Dose Analysis.

Noncited Violation 05000382/2004006-02: Failure to Promptly Correct Over-pressure Condition in Main Feed Water Isolation Valve Hydraulic Operating Systems

Introduction: The team identified a 10 CFR 50, Appendix B, Criterion XVI, noncited violation for situations where the licensee failed to promptly correct conditions adverse to quality associated with the main feed isolation valve hydraulic actuating systems. In two cases, the licensee failed to promptly correct high pressure conditions where the hydraulic actuator thermal relief valves failed to properly function. Consequently, the hydraulic portion of the valve actuator experienced repetitive over-pressure conditions. In one case, engineers failed to properly address system operability and, for a two-week period, actual valve operability was unknown. Contributors to the problems included 1) engineers did not properly understand all aspects of system design, and 2) the system did not have readily available pressure indication or high pressure alarms.

Discussion: The main feed isolation Valves FW-184A and FW-184B automatically close for containment isolation and to limit reactor coolant system cooldown during certain design basis accidents. Acceptable valve closure times range from 2.3 to 5.0 seconds. The lower closure limit is to preclude a water-hammer, which can be induced by fast valve closure. Each main feed isolation valve hydraulic operating system is equipped with two hydraulic accumulators. Both accumulators are required for proper valve operation. In order to limit valve speed, accumulator pressure is limited to 5900 psig. Each accumulator is equipped with a thermal relief valve to prevent over-pressurization.

The team identified two examples where the licensee failed to promptly correct conditions adverse to quality and, as a result, additional problems were experienced.

- On February 10, 2001, operators found that one FW-184A hydraulic accumulator thermal relief valve had failed to relieve pressure at its 5400 psig setpoint. The as-found system pressure was 5595 psig. The malfunctioning thermal relief valve was a condition adverse to quality. The licensee did not promptly correct the problem and on February 16, 2001, operators found pressure at 6080 psig, which was above the design pressure of 5900 psig. The licensee ultimately identified that a retaining clip was not properly installed in the relief valve.

- On February 20, 2004, operators found FW-184B hydraulic operating pressure at 5983 psig, which was above the design limit of 5900 psig. The team identified that the licensee did not perform an adequate operability evaluation and did not promptly correct the condition adverse to quality. In the operability assessment, the licensee stated that accumulator pressure was reduced therefore FW-184B was operable. However, the operability assessment did not address the potential for the system to over-pressurize again. The licensee did not start additional monitoring of hydraulic pressure until March 4, 2004, and then only on an infrequent basis. The status of the hydraulic system between February 20 and March 4 is unknown. On March 25, 2004, the licensee replaced the thermal relief valve. In addition, the licensee did not promptly identify the cause of the

February 20, 2004, thermal relief valve malfunction and on March 29, 2004, the replacement relief valve also failed. The failures were caused by debris (gelled hydraulic fluid) in the system. The licensee did not have the first relief valve tested until April 15, 2004, almost two months after its failure. After the second relief valve failure, the licensee performed more frequent pressure monitoring until the valve was replaced on May 18, 2004.

The team determined that poor understanding of system performance contributed to the continuing problems. Engineers did not fully understand what was causing the over-pressure conditions. Engineers believed that hydraulic system temperature alone was the cause for the system pressure increases and set up monitoring based on outside ambient temperature changes. The team determined that temperature alone could not explain the system pressure behavior. According to the hydraulic system vendor manual, pressure increases approximately 10 psig per degree Fahrenheit rise. The team observed that system pressure was not predictable based on this simple relationship. Therefore, there were other factors affecting hydraulic pressure that the licensee did not understand. In some cases, hydraulic system pressure increased as ambient temperatures lowered.

The team also noted that records were not available to identify all of the instances where hydraulic pressure may have exceeded its design limit. The hydraulic system accumulators do not have permanently installed pressure gages and no alarm warns operators of a potential over-pressure condition. Instead, craftsmen installed temporary gages each time that pressure monitoring was desired. Consequently, the licensee infrequently checked pressure, and typically only when a problem was suspected. In some instances, over-pressure conditions were identified after a low pressure alarm was received on one of the hydraulic system accumulators.

At the time of the inspection, the licensee was planning to add a high pressure alarm to the system by July 2004. As additional corrective measures, the licensee started monitoring accumulator pressures more frequently.

Analysis: The team determined that the issue was more than minor in significance because it affected the mitigating systems cornerstone objective to ensure the availability of systems that respond to initiating events. However, the finding was determined to be of very low risk significance because the issue: (1) was not a design or qualification deficiency; (2) did not result in the loss of a safety system; (3) did not represent an actual loss of a safety function of a single train for greater than its technical specification allowed outage time; (4) did not represent an actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (5) was not potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event.

Enforcement: The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion XVI, which requires the licensee to take prompt measures to correct conditions adverse to quality. The valve over-pressurization events, described above, are considered conditions adverse to quality. In each case, the licensee failed to promptly correct the conditions and additional consequences were experienced. Because the failure to promptly identify and correct the over-pressure condition was of very low safety significance and has been entered into the licensee's corrective action program as condition reports CR-WF3-2004-1533, 1540 and 1551, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: (NCV 05000382/2004006-02) Failure to Promptly Correct Overpressure Condition in Main Feed Water Isolation Valve Hydraulic Operating Systems.

Noncited Violation 05000382/2004006-03: Failure to Promptly Correct a Known Deficient Condition Involving the Failure to Account for Instrument Uncertainty to Satisfy Technical Specification Surveillance Requirement 4.7.6.5.a.

Introduction. The team identified a Green noncited violation of 10 CFR 50, Appendix B, Criterion XVI, for the failure to promptly identify and correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to correct a known deficient condition involving the failure to account for instrument uncertainty to satisfy Technical Specification Surveillance Requirement 4.7.6.5.a. This failure potentially affects the ability of the control room envelope to perform its design function with respect to protecting operators from postulated design basis accidents resulting in radiological releases.

Discussion. The team reviewed Condition Reports CR-WF3-1998-1439 and CR-WF3-2003-2115. Condition Report CR-WF3-1998-1439 discusses that during a review of design basis review open items it was noted that the differential pressure instruments used to satisfy Technical Specification 4.7.6.5.a have insufficient allowance between the 0.125 inch water gauge requirement and the procedure acceptance criteria (between 0.125 and 0.130 inch water gauge) to account for instrument uncertainty of approximately 0.2 inch water gauge. The team noted that the licensee determined instrument uncertainty was not required to be considered for this application because the instrument was not significant to safety. CR-WF3-2003-2115, written by electrical engineering design staff, discusses that due to the large uncertainty associated with the differential pressure instrument loop, measuring and test equipment should be used to satisfy the Surveillance Requirement 4.7.6.5.a requirements. A rigorous engineering calculation was performed demonstrating the instrument uncertainty to be 0.113 inch water gauge as read on the control room indicator, and 0.105 inch water gauge as read on the plant monitoring computer. The surveillance procedure allows use of either reading. The team noted that the licensee determined the intent of the surveillance was to demonstrate that leakage would be less than 200 standard cubic feet per minute with the control room envelope at a positive pressure above 0.0 inch water gauge, and since the instrument uncertainty was less than 0.125 inches water gauge the intent of the surveillance requirement was satisfied.

The team reviewed the licensee's Technical Specifications Surveillance Requirement 4.7.6.5.a and the Final Safety Analysis Report. Surveillance Requirement 4.7.6.5.a states, "The control room envelope isolation and pressurization boundaries shall be demonstrated operable at least once per 18 months by verifying that the control room envelope can be maintained at a positive pressure of greater than or equal to 1/8 inch water gauge relative to the outside atmosphere with a make-up air flowrate less than or equal to 200 cfm during system operation." Final Safety Analysis Report Chapter 6.4.3.2, "Habitability Systems, Leak Tightness," states, in part, "An acceptance test will be performed to verify the adequacy of the air makeup rate to maintain positive pressure inside the control room envelope of at least +0.125 inch water gauge." This section also states, "Since the leakage analysis shows a gross leakage rate of less than 0.06 volume changes per hour, gross leakage will be verified by periodic testing as described in Regulatory Guide 1.95." NRC Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," states in part, "The gross leakage characteristics of the control room should be determined by pressurizing the control room to 1/8-inch water gage and determining the pressurization flow rate (The use of a higher pressure differential is acceptable provided the flow rate is conservatively adjusted to correspond to 1/8-inch water gage)."

Based on this information the team determined that the intent of the surveillance requirement was to validate the leak-tightness of the control room envelope at a minimum of 0.125 inch water gauge. The team noted that the Technical Specifications, Final Safety Analysis Report and NRC Regulatory Guide 1.95 consistently state the intent of the test is to validate that at least 0.125 inch water gauge is obtained during the control room pressurization test. The team determined that the licensee's position that the intent of the surveillance is to demonstrate that leakage will be less than 200 standard cubic feet per minute with the control room envelope at a positive pressure above 0.0 inches water gauge was not appropriate since it reduces the margin of safety as described in the licensee's Technical Specifications and Final Safety Analysis Report. The team determined that the failure to correct a known deficient condition to account for instrument uncertainty for satisfying Technical Specification Surveillance Requirement 4.7.6.5.a was a violation of 10 CFR, Part 50, Appendix B, Criterion XVI, "Corrective Action."

Analysis. The deficiency associated with this finding was the failure to correct a condition adverse to quality. Specifically, on multiple occasions the licensee failed to correct a known deficient condition involving the failure to account for instrument uncertainty to satisfy Technical Specification Surveillance Requirement 4.7.6.5.a. This failure potentially affects the ability of the control room envelope to perform its design function with respect to protecting operators from postulated design basis accidents resulting in radiological releases. This finding was greater than minor because it affected the barrier integrity cornerstone objective related to maintaining the barrier function of the control room envelope. This finding was evaluated using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet under the containment barriers cornerstone. The finding was determined to be of very low safety significance because the deficiency only affected the radiological barrier function provided for the control room.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. The failure to promptly identify and correct a known deficient condition involving the failure to account for instrument uncertainty to satisfy Technical Specification Surveillance Requirement 4.7.6.5.a. is a violation of 10 CFR 50, Appendix B, Criterion XVI. Because the failure to promptly identify and correct the analysis was of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-WF3-2004-1561, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: (NCV 05000382/2004006-03), Failure to Promptly Identify and Correct a Known Deficient Condition Involving the Failure to Account for Instrument Uncertainty to Satisfy Technical Specification Surveillance Requirement 4.7.6.5.a.

4OA6 Exit Meeting

The team discussed the findings with you and other members of the licensee's staff on May 21, 2004. Licensee management did not identify any materials examined during the inspection as proprietary.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Borel, Senior Quality Assurance Engineer
E. Brauner, Acting Manager, System Engineering
R. Brian, Director, Engineering
J. Burke, Supervisor, Quality Assurance
W. Campbell, Chief Operating Officer, Entergy Nuclear South
C. DeDeaux, Licensing Engineer
R. Dodds, Vice President's Staff
C. Fugate, Manager, Operations
T. Gaudet, Equipment Reliability Lead Engineer
A. Harris, Manager, Engineering Projects
J. Holman, Manager, Nuclear Engineering
B. Huston, Acting Manager, Nuclear Safety and Assurance
J. Laque, Manager, Maintenance
B. Lindsey, Operations Control Room Supervisor
D. Litoff, Operations Shift Technical Advisor
R. Murillo, Senior Staff Engineer
R. Osborne, Manager, Engineering Programs and Components
R. Peters, Manager, Planning, Scheduling and Outages
O. Pipkins, Licensing Engineer
R. Porter, Superintendent, Mechanical Maintenance
J. Rachal, Design Engineer
J. Ridgel, Manager, Corrective Action Program
T. Schreckengast, Operations Shift Manager
K. Walsh, General Manager, Plant Operations
R. Williams, Licensing Engineer
J. Venable, Vice President, Operations

NRC

W. Jones, Chief, Project Branch E, Division of Reactor Projects, Region IV

ITEMS OPENED AND CLOSED

Opened and Closed

05000382/2004006-01	NCV	Failure to Promptly Identify Inappropriate Assumption and Correct Control Room Operator Dose Analysis (Section 4OA2 e.)
05000382/2004006-02	NCV	Failure to Promptly Correct Over-pressure Condition in Main Feed Water Isolation Valve Hydraulic Operating Systems (Section 4OA2 e.)
05000382/2004006-03	NCV	Failure to Promptly Correct a Known Deficient Condition Involving the Failure to Account for Instrument Uncertainty to Satisfy Technical Specification Surveillance Requirement 4.7.6.5.a. (Section 4OA2 e.)

DOCUMENTS REVIEWED

PLANT PROCEDURES

Procedure	Title	Revision
CE-002-030	Maintaining Diesel Fuel Oil	8
DC-115	ER Response Development	4
LI-102	Corrective Action Process	4
LI-104	Self Assessment and Benchmark Process	5
LI-118	Root Cause Analysis Process	0
MI-005-644	Feedwater Isolation Valve A or B Operations Check	7
OE-100	Operating Experience Program	1
OP-100-0014	Technical Specification and Technical Requirements Compliance	13
OP-902-002	Loss of Coolant Accident Recovery	9
OP-902-003	Loss of Offsite Power / Loss of Forced Circulation Recovery	4
OP-902-009	Standard Appendices	1
OP-903-046	Emergency Feedwater Pump Operability Check	15
OP-903-110	RAB Fluid Systems Leak Test	5
UNT-007-011	Section 6.7, “Operability and Reportability Assessment Guidance”	7
UNT-005-004	Temporary Alteration Control	16

ENGINEERING REQUESTS

Number	Title	Revision/Date
ER-W3-98-0764-0001	Affects of uncontrolled maximum EFW on accident situations	June 21, 2002
ER-W3-00-0106-002	RC-Reactor Coolant , CVC-Chemical and Volume Control System	Revision 0

ER-W3-00-0896-00-00	Insulation Removal for HPSI	November 2, 2000
ER-W3-01-0299-00-00	Safeguards Room B Safety Related Equipment Evaluation	May 1. 2001

CALCULATIONS

Number	Title	Revision/Date
EC-P98-001	MFIV Closure Time FW Transient Analysis and Evaluation of FW Piping due to Check Valve Slam	February 2, 1999
EC-M98-003	Design Basis for Feedwater Isolation Valves FW-184A & FW-184B	March 8, 2004
EC-M101-001	Seismic and Weak Link Analysis for Feedwater Isolation Valves	February 2, 2001
EC-M02-001	Minimum Required EFW Pumps Discharge Pressure during Recirculation	January 31, 2002
EP-S-001-W	Steam Generator ECT Data Analysis for Waterford 3	Revision 01
MNQ-10-1	Emergency Feedwater System Head Curves	February 2, 2004
MPR-2299	Replacement Interval and Shelf Life of Electrolytic Capacitors Used in Woodward Controls	Revision 0

CONDITION REPORTS, CR-WF3-

1998-0792	2001-0352	2001-1232	2002-0953	2003-0090
1998-0844	2001-0410	2001-1341	2002-0987	2003-0140
1998-1439	2001-0433	2001-1360	2002-1002	2003-0147
1999-1208	2001-0436	2001-1364	2002-1230	2003-0199
2000-0148	2001-0456	2002-0178	2002-1422	2003-0241
2000-0432	2001-0500	2002-0220	2002-1426	2003-0384
2000-0341	2001-0512	2002-0224	2002-1516	2003-0395
2000-0470	2001-0649	2002-0297	2002-1587	2003-0977
2000-1270	2001-0748	2002-0339	2002-1898	2003-1069
2000-1564	2001-0831	2002-0390	2002-1949	2003-1242
2001-0109	2001-0829	2002-0408	2002-1950	2003-1303
2001-0191	2001-0852	2002-0448	2002-2147	2003-1317
2001-0225	2001-0853	2002-0804	2003-0041	2003-1345
2001-0247	2001-0988	2002-0824	2003-0062	2003-1441
2001-0317	2001-1110	2002-0907	2003-0089	2003-1528

2003-1679	2003-2555	2003-3716	2004-0156	2004-0861
2003-1687	2003-2666	2003-3721	2004-0304	2004-0862
2003-1794	2003-2832	2003-3740	2004-0311	2004-0874
2003-1942	2003-2972	2003-3803	2004-0477	2004-0973
2003-2044	2003-3110	2003-3837	2004-0524	2004-0987
2003-2064	2003-3130	2003-3891	2004-0551	2004-1433
2003-2075	2003-3164	2003-3997	2004-0584	2004-1518
2003-2097	2003-3260	2004-0020	2004-0608	2004-1521
2003-2115	2003-3263	2004-0026	2004-0725	2004-1533
2003-2147	2003-3280	2004-0050	2004-0784	2003-0033
2003-2495	2003-3371	2004-0053	2004-0800	2003-0030
2003-2502	2003-3592	2004-0126	2004-0827	2003-1614
2003-2554				

ROOT CAUSE ANALYSIS REPORTS FOR CR-WF3-

2001-0317 2002-0339 2003-0062 2003-3891 2004-759 2004-1011

LEARNING ORGANIZATION CONDITION REPORTS

LO-OPX-2002-0323	LO-OPX-2003-0217	LO-OPX-2004-0033	LO-WLO-2004-0011
LO-OPX-2003-0140	LO-OPX-2003-0203	LO-OPX-2004-0097	

WORK ORDERS

01149460	00406063	00413294	00418106	00427487
00016935	00406123	00413294	00418833	50010593
00028163	00408858	00414583	00421755	50010596
00402623	00411419	00416489	00423685	50010598
00405942	00411422	00417942	00426301	50093392

MAINTENANCE ACTION ITEMS

24076 23329 24077 32748 34888 34904

OTHER

Diesel Fuel Oil Storage Tank Administrative and Alarm Limits	February 14, 2004
2004 Top Ten Equipment Reliability Issues	April 27, 2004

10 CFR 50.59 Screening for Compensatory Measures for Switchgear Ventilation Damper SVS-102	January 9, 2003
Safety Injection System Description	Revision 7
Emergency Feedwater System Description	Revision 8
Emergency Feedwater System Health Report	May 5, 2004
Emergency Feedwater Design Basis Document	Revision 2-7
Entergy Nuclear South Alloy 600 Project, Long Range Plan	February 9, 2004
Waterford 3 Safety Culture Survey Summary Report	May 12, 2004
ENS Corrective Action Program Quality Assurance Audit Report	June 10, 2003
Problem Identification & Resolution Assessment	March 12, 2004
IST Trend Data for 9 pumps and 11 valves	
Waterford 3 Daily Plant Status Reports	
1st Quarter 2004 Waterford 3 Quarterly Trend Report	
Entergy Nuclear South Condition Report Initiation Guidance Pamphlet	

INITIAL MATERIAL REQUEST

INITIAL INFORMATION REQUEST FROM WATERFORD 3
FOR PI&R INSPECTION (Report Number 05000382/2004006)

The inspection will cover the period of October 2002 to March 2004. The information may be provided in either electronic or paper media or a combination thereof. Information provided in electronic media may be in the form of CDs, or 3½ inch floppy disks. The agency's text editing software is Corel WordPerfect 8, Presentations, and Quattro Pro; however, we have document viewing capability for MS Word, Excel, Power Point, and Adobe Acrobat (.pdf) text files.

Please provide the following information to Peter Alter by March 29, 2004 at the Resident Inspector Office at Waterford-3

All procedures governing or applying to the corrective action program, including the processing of information regarding generic communications and industry operating experiences

Procedures and descriptions of any informal systems, used by engineering, operations, maintenance, security, training, and emergency planning for issues below the threshold of the formal corrective action program

A searchable table of all corrective action documents [condition reports (CRs)] that were initiated or closed during the period, include CR number, description of issue and significance classification

Either annotate on the above list or a separate list of all CRs associated with:

(1) Human performance issues
(2) Emergency preparedness issues
(3) Response to 10 CFR 21 reports

A separate list of all CRs closed to other programs, such as MAIs/WOs, ERs, etc.

A copy of each Significant Event Review Team Report and Root Cause Analysis Report for the period (not necessarily the whole CR)

Copies of CRs (for the period) associated with non-escalated (no response required) or noncited violations for the period

Copies of CRs (for the period) associated with repetitive problems or issues

Copies of CRs (for the period) associated with ineffective or untimely corrective actions

List of all self assessments or QA assessments/audits for the period

All corrective action program reports or metrics used for tracking effectiveness of the corrective action program for the period

All quality assurance audits and surveillances, and functional self assessments of corrective action activities completed for the period

Control room logs for the year 2003

Security event logs for the year 2003

Radiation protection event logs for the year 2003

List of risk significant systems from W3 PRA/PSA, based on risk achievement worth (RAW) and "0% availability CDF"

Searchable list of all maintenance action items/work orders for the period

List of all SSC’s placed in or removed from the maintenance rule a(1) category for the period

All corrective action documents related to the following industry operating experience generic communications:

<u>NRC Bulletins</u>

NRC BULLETIN 2002-001 Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity

<u>NRC Information Notices</u>:

NRC INFORMATION NOTICE 2004-001 Auxiliary Feedwater Pump Recirculation Line Orifice Fouling - Potential Common Cause Failure

NRC INFORMATION NOTICE 2003-019 Unanalyzed Condition of Reactor Coolant Pump Seal Leakoff Line During Postulated Fire Scenarios or Station Blackout

NRC INFORMATION NOTICE 2003-013 Steam Generator Tube Degradation at Diablo Canyon

NRC INFORMATION NOTICE 2003-011 Leakage Found on Bottom-Mounted Instrumentation Nozzles

NRC INFORMATION NOTICE 2003-008 Potential Flooding Through Unsealed Concrete Floor Cracks

NRC INFORMATION NOTICE 2003-005 Failure to Detect Freespan Cracks in PWR Steam Generator Tubes

NRC INFORMATION NOTICE 2003-002 Recent Experience With Reactor Coolant System Leakage And Boric Acid Corrosion

NRC INFORMATION NOTICE 2002-034 Failure of Safety-Related Circuit Breaker External Auxiliary Switches at Columbia Generating Station