

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-382
License No.: NPF-38
Report No.: 50-382/97-21
Licensee: Entergy Operations, Inc.
Facility: Waterford Steam Electric Station, Unit 3
Location: Hwy. 18
Killona, Louisiana
Dates: September 22-26 and October 6-10, 1997
Inspectors: M. Runyan, Senior Reactor Inspector
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Approved By: T. Stetka, Acting Chief, Engineering Branch
Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Waterford Steam Electric Station, Unit 3
NRC Inspection Report 50-382/97-21

Engineering

- A noncited violation was identified for failure to provide backup overcurrent protection for containment electrical penetrations associated with Hydrogen Analyzers A and B, and for failure to properly test the primary overcurrent protection devices installed on the same penetrations (Section E8.14).
- The licensee failed to update the technical requirements manual in accordance with site procedures after identifying a number of inaccuracies. This was identified as the first example of a violation of 10 CFR Part 50, Appendix B, Criterion V (Section E8.14).
- The licensee failed to issue a condition report upon discovery of an error in a calculation associated with the containment spray riser level gauges. This was identified as the second example of a violation of 10 CFR Part 50, Appendix B, Criterion V (Section E8.22).
- A noncited violation was identified for failure of the refueling machine to meet technical specification requirements concerning continuous overload protection and for a failure to have an adequate surveillance procedure to test the control element assembly mast minimum load capacity (Section E8.23).

Report Details

Summary of Plant Status

The unit operated at 100 percent power during the inspection.

II. Maintenance

M8 Miscellaneous Maintenance Issues

M8.1 (Closed) Inspection Followup Item 50-382/9623-04: Inspection of Emergency Diesel Generators Air Receiver Tanks

Background

The inspectors reviewed surveillances for the carbon steel air receiver tanks used to monitor for the development of potential internal corrosion. Ultrasonic measurements of the thickness of the air receivers identified that the bottom of the A2 air receiver indicated a possible corrosion caused degradation that reduced the wall thickness allowance. The licensee evaluated the condition for operability and concluded that the unit was operable. Condition Report 96-1792 was initiated to evaluate and resolve the issues.

Inspector Followup

The inspectors reviewed the condition report and supporting documentation. The licensee performed a boroscopic/visual inspection of the air receiver on January 23, 1997, in accordance with Work Authorization 01152820. The inspection identified that while the internal surfaces of the air receiver were very dry, there were signs of corrosion around the entire surface and there was some flaking rust. No deep pits were identified. The licensee's engineering staff concluded that continued corrosion would occur at a slow rate, allowing time for trending of corrosion via performing periodic ultrasonic thickness measurements.

The licensee initiated added ultrasonic inspections of all four emergency diesel generator air receivers to its surveillance schedule at a performance interval of 60 months. The inspectors verified that the tasks had been entered into the licensee's repetitive task system. The due date for the next inspection was July 30, 2002. Based upon the results of the licensee's ultrasonic measurements and visual inspection, the inspectors determined that the air receiver tank corrosion was

minimal. The licensee was continuing a monthly operations task of draining any residual moisture from the receivers to minimize continuing corrosion. The inspectors considered the licensee's implementation of a periodic task to perform ultrasonic thickness measurements an acceptable means of trending air receiver wall degradation due to corrosion.

III. Engineering

E8 Miscellaneous Engineering Issues

E8.01 (Closed) Inspection Followup Item 50-382/9325-02: Failure to Revise Design Documents

Background

The licensee identified several instances where drawing revision notices and work authorizations used to revise the plant configuration resulted in a failure to properly depict the incorrect as-built configuration of the plant, as delineated in plant drawings. In response to these findings, the licensee sampled the design changes performed under drawing revision notices and work authorizations to determine if there were any additional failures to properly revise affected documents.

Inspector Followup

The licensee performed an initial review of 58 nonconformance condition identifications. Based on discrepancies found in this sample, the licensee decided to review an additional 117 nonconformance condition identifications. Out of a sample of 175, the licensee identified 11 instances where the design documents were not updated as required. This represented an error rate of approximately 7 percent. However, the licensee determined that none of the 11 discrepancies were more than minor, nor did any create an operability or safety concern.

The licensee also reviewed its condition report database for configuration issues. To address the generic concerns associated with these configuration-related condition reports, the licensee initiated Condition Report 94-0761. This condition report was initiated prior to completion of the nonconformance condition identification review, but was considered to be addressing the same issues; therefore, a new condition report was not initiated.

The inspectors noted that while Condition Report 94-0761 did not explicitly address nonconformance condition identifications, the drawing reviews performed within this

effort would have found discrepancies caused by previously mishandled nonconformance condition identification. The inspectors considered the lack of a condition report specifically addressing the approximate 7 percent error rate for nonconformance condition identification to constitute a weakness in the overall response to this issue, but that from a safety perspective, this oversight was of minimal significance. The inspectors considered the licensee's actions to be sufficient.

E8.02 (Closed) Inspection Followup Item 50-382/9325-04: Review of Problem Evaluation/Information Request Process

Background

The inspectors noted that some of the recommended actions included in a specific problem evaluation/information request had not been completed. The inspectors noted that these recommended actions were not tracked for completion in the licensee's corrective action process. The inspectors noted that the licensee's procedure for Problem Evaluation/Information Requests NOAP-018, "Problem Evaluation/Information Request," Revision 1, did not require tracking recommended actions to completion. The licensee intended to evaluate their problem evaluation/information request process.

Inspector Followup

The licensee replaced Procedure NGAP-018 with Site Directive W5.602, "Problem Evaluation/Information Request," Revision 0. This procedure contained additional guidance concerning when to use the problem evaluation/information request process, but still did not require formal tracking of recommendations. In 1997, the licensee replaced the problem evaluation/information request process with what was termed the engineering request program. This new process was contained in Procedure W4.104, "Engineering Request Process," Revision 0. As in Site Directive W5.602, this procedure did not require followup of recommended actions. The inspectors considered this process acceptable as long as the recommended actions were only enhancements and not actions needed to correct a condition adverse to quality. The inspectors reviewed a sample of engineering requests (97-22, 97-80, 97-89, 97-98, 97-100, 97-193, 97-206) to determine whether recommended actions identified in these reports were corrective actions for conditions adverse to quality. From this review, the inspectors determined that none involved conditions adverse to quality. In addition, the inspectors noted that several examples existed where condition reports had been written by engineering for discrepant conditions discovered during the review.

The inspectors concluded that the licensee's use of recommended actions without a followup process within the engineering request process was acceptable.

E8.03 (Closed) Violation 50-382/9335-01: Inadequate Design Control and Implementation of a Modification Resulted in Component Cooling Water Train Cross-Connection.

Background

In 1988, the licensee implemented Design Modification MP-1960 to the component cooling water system that installed a portable chiller system and provided chilled water to the containment fan coolers. The modification included the installation of two safety-related butterfly valves, CC-8241A and CC-8251B, to provide train isolation of the piping prior to a common chilled water outlet line. Pneumatic actuators that were supplied with the valves were not necessary for this application and were replaced with nonsafety-related manual operators prior to installation in the plant.

In 1994, the licensee determined that the component cooling water system was degraded because of inadequate train separation. The butterfly valve discs were found misaligned from the indicated valve position due to incorrect installation of the valve operator. The valves were partially open when the position indicator indicated closed. The NRC determined that there were no work instructions provided to install the replacement operators, there was no commercial-grade evaluation to determine the adequacy of the nonsafety-related operators in a safety-related application, and there was inadequate post-modification testing to verify that the modification was correctly installed.

Inspector Followup

A similar violation (50-382/9335-02) relating to the same event was reviewed and closed in NRC Inspection Report 50-383/95-05. Corrective actions implemented by the licensee and verified in the previous inspection for that violation were similar to those identified for the subject violation. Corrective actions for the identified design change, work order preparation, and post-installation testing continued to be implemented. The inspectors reviewed Commercial Grade Evaluation LPTSM1960M0040, Revision 0, for the butterfly valve manual operators and concluded that it provided an acceptable justification for the use of these operators in a safety-related application. The inspectors also reviewed System Operating Procedure OP-002-003, "Component Cooling Water System," Revision 11, and Administrative Procedure OP-100-009, "Control of Valves and Breakers," Revision 14, and verified that the system lineup checklists required these valves to be locked in the closed position for system operability.

The inspectors determined that the licensee had adequately resolved the issues associated with this violation.

E8.04 (Closed) Inspection Followup Item 50-382/9407-01: Vendor Information

Background

Two weaknesses were identified by the NRC concerning the licensee's program for controlling information in vendor technical manuals. First, the licensee was not maintaining records of its annual contacts with vendors to ensure that all relevant information, such as service bulletins, had been received by the licensee. Although the licensee sent letters to the vendors, no tracking was performed to ensure that responses were received. Also, response letters that were received were not being retained for records storage. In addition, when information was received from the vendors, it was not being incorporated into the technical manuals in a user-friendly manner. Typically, the change was placed at the end of the manual without marking the text that was affected by the change. Therefore, a user of a technical manual could extract superseded information unless a time-intensive search of all changes was routinely performed each time the manual was used. These two weaknesses had the collective effect of increasing the chance that current vendor information was not being used for at least some safety-related work.

Inspector Followup

The licensee initiated Condition Report 94-262 to address both concerns. The licensee decided to perform a formal assessment of the vendor equipment technical information program. This assessment was documented in Report 94-012, "Vendor Equipment Technical Information Program (VETIP)," dated September 13, 1994. The inspectors reviewed this report and determined that it addressed both weaknesses.

The licensee revised Procedure UNT-004-035, "Control of Vendor Information," Revision 5, to address, among other matters, the two NRC-identified issues. The inspectors verified that the procedure now required a reviewer to determine whether text marking was necessary when vendor information affecting a technical manual was received. The procedure also required that annual requests be submitted to vendors to request a listing of documents sent during the past year. The procedure required that vendor responses to these requests be kept as quality assurance records. The inspectors concluded that the new procedural guidelines were sufficient to preclude recurrence of the originally-identified deficiencies.

To address the possibility that some vendor technical manual changes were lost during the years preceding the procedural upgrades, the licensee sent letters to each critical (supplier of safety-related equipment) vendor asking for a list of all issuances since 1991 that affected technical manuals under their cognizance. Following completion of this process, the licensee was confident that their technical manuals were up to date.

E8.05 (Open) Violation 50-382/9407-02: Failure to Provide Adequate Procedure

Background

Procedure MM-003-041, "Five Year Emergency Diesel Generator Inspection," Revision 0, was inadequate in that it did not provide instructions to clean and lubricate the fuel injector pump mounting fasteners in accordance with vendor specifications. The failure to lubricate properly the fasteners could have caused the applied prestress to be less than the minimum design value, which could lead to failure of the fasteners.

Inspector Follow-up

The licensee found that an additional procedure, MM-003-042, "Ten Year Emergency Diesel Engine Inspection," Revision 0, was affected by the same problem. The licensee revised both this procedure and MM-003-041 to require that the fuel injector pump mounting fasteners be lubricated with Lubriplate, or equivalent, prior to installation. The inspectors noted that the procedures did not specify Lubriplate 630-AA, which was specified by the vendor, but just stated that "Lubriplate or equivalent lubricant" should be used. The licensee acknowledged the problem and indicated that a review of the procedures to determine if further revision was necessary would be done. The licensee also revised Cooper Industries Drawing KSV-18-4, "Fuel Injection Pump," to include the requirement for the mounting fasteners to be lubricated. In this case, Lubriplate 630-AA or equivalent was specified.

The licensee conducted two training sessions that discussed this violation, one with the entire plant staff and one specifically for maintenance personnel. The inspectors reviewed training plans and noted that they adequately addressed bolt lubrication.

Because of the procedure discrepancies, the inspectors determined that the violation should be left open until these issues were corrected by the licensee.

E8.06 (Closed) Violation 50-382/9426-01: Failure to Initiate an Update to the Station Information Management System

Background

The licensee failed to update the station information management system in accordance with Procedure UNT-007-014, "Administrative Procedure Setpoint Change Control," Revision 6. During a review of Setpoint Change 93-011, the NRC observed that the boric acid makeup tank temperature controllers and alarm setpoints had been lowered on July 23, 1994, in accordance with Work Authorization 01125613 and Condition Identification CI 291307. Procedure MD-001-032, "Administrative Procedure Work Authorization Closing,"

Revision 0, required that the work authorization be routed to system engineering if it implemented a setpoint change. When questioned about the closure of Work Authorization 01125613, the licensee was unable to locate it and concluded that it was lost. The NRC attempted to verify the updated setpoint, as documented in the station information management system, and noted that none of the temperature controller setpoints had been updated with the final values as of December 1, 1994. Two of the four temperature controllers had been identified or posted as having an outstanding work authorization in effect.

Inspector Followup

The inspectors reviewed NRC Inspection Report 50-382/94-26 and the licensee's response to the violation documented in Letter W3F1-95-0009, dated February 1, 1995. The inspectors also interviewed licensee personnel.

The licensee determined that the root cause was personnel error: since the responsible engineer posted station information management system updates for only two components when four components were actually affected. The inspectors reviewed Condition Report 94-1139, dated December 6, 1994, which the licensee initiated for this incident. The licensee's immediate corrective action was to revise the station information management system to include the correct setpoints for the two component setpoints that were not revised previously. The inspectors reviewed printouts from the data base and verified that the setpoints were correctly revised.

The inspectors reviewed Quality Assurance Assessment 95-001, which assessed the station information management system setpoint data base as a result of the violation. The assessment team found a number of discrepancies in the setpoint data base and concluded that a further investigation was warranted. The licensee generated Significant Condition Report CR-95-0064, dated January 31, 1995, based on the quality assurance assessment. As part of the corrective action, the licensee verified the entire data base, found numerous errors, and generated 12 condition reports to document the setpoint errors.

The inspectors determined that the licensee revised the manner in which they updated the station information management system setpoint data. The inspectors reviewed Procedure DEPT-I-306, "Preparation and Handling of Document Revision Notices," Revision 2, which required that setpoint changes be processed in accordance with document revision notices. The inspectors reviewed Procedure NOECP-306, "Document Revision Notices," Revision 4, which provided the methods for initiating, preparing, reviewing and approving a document revision notice to revise existing controlled documents. The inspectors determined that a document revision notice could only be closed after all the affected documents were updated. For non-critical changes (changes that would not affect control room documents involving operational decisions), there was up to a 18-month period

where the change would be posted against the station information management system setpoint data base item. The inspectors concluded that the document revision notice method would ensure that the setpoint changes would be posted until the document was revised.

E8.07 (Closed) Inspection Followup Item 50-382/9426-02: Licensee's Actions to Prevent Pressure Surges in the Containment Spray Piping

Background

The NRC identified that there were no instructions for venting the containment spray system after two new vent valves were added to the system. The NRC reviewed Condition Identification 287461, which documented a pressure surge that occurred in Containment Spray Header A in September 1993 during post-maintenance testing. The licensee concluded that the pressure surge was, in part, caused by air entrained within the piping and trapped between the closed isolation valves and an upstream check valve. The pressure measured was 469 psig in part of the system that had a 300 psig design pressure. The licensee stated that pressures as high as 570 psig may have occurred in the past. The licensee installed two vent valves in areas of the system where local high points existed. However, the NRC noted that the licensee did not provide instruction or procedure changes to provide guidance for venting activities.

Inspector Followup

The inspectors reviewed ASME Section III, Article NC-7000, and determined that a relief valve was not needed for this application since there was no heat source that would have caused the water in the piping to expand and increase the pressure. The licensee stated that the pressure surges seen by the section of containment spray piping occurred during quarterly testing of the containment spray pump. Air was trapped in the high points of the piping from some previous maintenance activity. When the pump was run, the air in the piping was compressed which caused a spike in pressure.

The inspectors reviewed Procedure OP-009-001, "System Operating Procedure Containment Spray," Revision 8, and noted that the procedure had added the containment spray vent valves. The inspectors reviewed Procedure OP-009-005, "System Operating Procedure Shutdown Cooling System," Revision 14, and determined that the procedure had been revised to include instructions for venting the containment spray piping with the two new vent valves.

The inspectors reviewed Calculation EC-M95-002, "Containment Spray System Pressurization Due to Check Valve Leakage and the System Structural Integrity," Revision 1. The purpose of the calculation was to evaluate the containment spray system for structural integrity due to overpressurization and to assure that the

valves installed in the header met the valve rating at 100°F. The inspectors determined that the effects of overpressure met the requirements of NC-3652 of the ASME Section III code. The inspectors also found that the affected valves installed in the headers met the valve ratings at 100°F.

E8.08 (Closed) Inspection Followup Item 50-382/9426-03: Licensee's Actions for Tracking and Trending Condition Reports for Generic Concerns

Background

The NRC identified that the licensee did not track or trend condition reports for generic concerns and found, in effect, that the licensee did not look for repetitive failures. The licensee stated that an audit group was being established to review all condition reports for generic implications, and, to ensure that failures were investigated for similar components in other applications.

Inspector Followup

The inspectors reviewed Procedure UNT-006-018, "Condition Report Trending," Revision 5, which established the requirements for trending condition reports. The inspectors determined that each condition report not administratively closed was assigned a four-letter problem code and keyword entered into the condition report trending data base. For each condition report, a search was made in the condition data base for the assigned problem code, system, component and keyword. The licensee then evaluated this information to determine if this were a repeat or similar problem to one previously documented in a condition report. The procedure required a root-cause analysis if an adverse trend was found. The inspectors reviewed a condition report trend report, dated September 9, 1997, and found that the licensee had identified 19 adverse trends and 36 degraded trends. For the adverse trends, the licensee identified a root cause and proposed corrective actions. In addition, the inspectors reviewed the second quarter of 1997 global trend system report. The purpose of the report was to delineate the results of trending activities in process. The inspectors determined that the licensee developed a program for trending condition reports for generic or repetitive concerns.

E8.09 (Closed) Inspection Followup Item 50-382/9511-01: Licensee's Actions to Clarify Fire Alarm Annunciator Procedure

Background

The NRC identified that paragraph 6.4.1 of the Fire Protection Procedure FP-001-020, "Fire Emergency/Fire Report," required the licensee to sound the plant fire alarm upon receipt of a fire annunciator indication in the control room. However, in actual practice, the licensee verified that a fire actually existed prior to sounding the alarm. The NRC discussed the fire alarm annunciator

response procedure with the fire protection engineer to determine if intermediate steps between receipt of a fire alarm annunciator and the actual activation of the plant fire alarm should be acknowledged and included in the procedure.

Inspector Followup

The inspectors reviewed Procedure FP-001-020, "Fire Emergency/Fire Report," Revision 10. The inspectors found that the intermediate steps between receipt of a fire alarm annunciator and the actual activation of the plant fire alarm were included in the revised procedure. The revised procedure stated that upon receipt of a report of a fire or confirmation of a fire alarm annunciation, the plant operator would sound the fire alarm. The inspectors determined that the licensee's revision to Procedure FP-001-020 adequately clarified when the operator would sound the fire alarm.

E8.10 (Closed) Inspection Followup Item 50-382/9513-04: Missing Solenoid Valve Covers on Emergency Diesel Generator Starting Air Valves

Background

The NRC identified that the emergency diesel generator starting air solenoid valves had missing or degraded exhaust port covers. Furthermore, the NRC was concerned that the missing/degraded covers affected valve operability. In 1988, the licensee implemented a vendor recommendation to install exhaust port covers on emergency diesel generator solenoid valves. The covers were installed to prevent debris from contaminating the solenoid valves. In addition, vendor documents included a caution to not paint over the exhaust port covers. Design controls were not properly implemented resulting in removal, damage, and painting of some covers. The NRC determined that the starting solenoid air valves were part of the diesel skid and were not ASME components or included in the inservice test program. The NRC concern was that the licensee had not tested the valves to confirm redundant operability of the individual air start valves. That is, diesel testing confirmed their collective operability, but this may have missed individual valve failures that could compromise the intended redundancy of the system.

Inspector Followup

The inspectors reviewed Work Authorizations 01447784 and 01447785, which replaced all of the emergency diesel generator starting air solenoid valves in May 1997. Work Authorization Task 021802 described the 18-month test method for the starting air valves were tested every 18 months. The inspectors found that when a single air receiver start test was performed, one bank of starting air was isolated and the other bank tested. There were two starting air solenoid valves per bank and both banks were tested during each outage. The inspectors reviewed Work Authorization 01158588, dated May 4, 1997, and found that the work

authorization contained instructions for the air start tests performed during the last outage. Upon an emergency diesel generator start, if one of the two solenoid valves failed to vent, the tubing between the solenoid valve and the shuttle valve was kept depressurized preventing its associated pressure switch contacts from closing. If one of the normally open contacts from any one of six pressure switches did not close, the starting air system malfunction alarm would annunciate. In addition, if any one of the air start solenoid valves failed open during an emergency diesel generator start test, its associated air receiver would be completely depressurized. The licensee stated that this test was designed to confirm the redundant operability of individual air start solenoid valves.

The inspectors requested a history of the number of times that the annunciator had alarmed indicating a solenoid valve failure. Licensee personnel reviewed data and determined that there had been no solenoid valve failures since 1991. The inspectors determined that the previously-installed solenoid valves were operable despite the degraded covers and that the emergency diesel generator starting air valves were being adequately tested.

E8.11 (Closed) Inspection Followup Item 50-382/9520-01: Definition of a Continuous Fire Watch

Background

The NRC questioned whether the licensee's definition of a continuous fire watch was consistent with that defined in the approved fire protection program. For circumstances that required a continuous fire watch, the licensee's definition allowed a single fire watch person to patrol more than one location at a time. This definition would allow the fire watch to be absent from a location requiring a continuous fire watch for up to 20 minutes.

The NRC issued Information Notice 97-48, "Inadequate or Inappropriate Interim Fire Protection Compensatory Measures," which identified this issue as an example of a problem in the conduct of fire watch duties.

Inspector Followup

The inspectors reviewed the licensee's Fire Protection Procedure FP-001-014, "Duties of a Fire Watch," Revision 10, Change 2, "Operational Experience Engineering Evaluation for Information Notice 97-48, and Fire Watch Training Handout and Lesson Plan No. W3-LP-FWT-01.01." The inspectors also interviewed the fire protection engineer and fire watch personnel.

The inspectors noted that Revision 10 of Procedure FP-001-014 included a change to the definition of a continuous fire watch. The revised procedure stated in Limitation 5.2.1, "For posting of a 'Continuous Fire Watch' the following limitations shall apply: Each location requiring a fire watch within a specified area will be observed continuously."

The inspectors noted that the current revision of fire watch training materials still contained the previous definition of a fire watch. The inspectors discussed this with the fire protection engineer and fire watch training coordinator. They informed the inspectors that no students had required the fire watch certification or requalification training since the procedure change had taken effect and that the training materials would be revised prior to their next use. The licensee informed the inspectors that all fire watch personnel had been briefed on the procedure change when it occurred and were familiar with the new requirements for a continuous fire watch. The inspectors confirmed this during interviews with other fire watch personnel.

E8.12 (Closed) Violation 50-382/9520-02: Failure to Implement Fire Protection Program Fire Watch Procedural Requirements

Background

The NRC identified a violation with several examples of a failure to implement fire protection program procedures for fire watch patrols. These failures included instances where required fire watch tours were not being performed and required log entries were being falsified.

In its response to the Notice of Violation, the licensee identified several actions taken and that would be taken to improve the fire watch program. Condition Report CR-96-0081 was written to evaluate the adverse trend of fire watch discrepancies and a root-cause analysis was performed.

Inspector Followup

The inspectors reviewed condition and root-cause analysis reports, procedures, training materials, fire watch logs, and quality assurance department surveillance reports on the adequacy of fire watch patrols. Additionally, the inspectors interviewed personnel including the security department superintendent (whose organization had ownership of the fire patrol program), the fire watch coordinator, fire watch training coordinator, fire protection engineer, and fire watch personnel. The inspectors also accompanied fire watch personnel on a fire watch patrol in the plant.

The licensee implemented an electronic watch station system in the facility, which required that fire watch personnel key in at the individual stations to validate their presence in the area. The hourly patrol data was downloaded to the computer located in the secondary alarm station so that the shift security supervisor would know immediately if any locations were missed.

Several improvements were made in the administrative control of the addition and deletion of impairments from the fire watch patrol logs. The inspectors reviewed Procedure FP-001-015, "Fire Protection System Impairments," Revision 13, Change 2, and verified that the improvements the licensee developed for the creation of impairments were better coordinated with the security organization. Other procedure improvements included a formalized impairment acceptance process and walkdown, and improvements in the development of fire watch log sheets to address differences in nomenclature, etc., to aid the fire watch in locating the impairment. Management improved the fire watch program by creating a fire watch coordinator and lead fire watch positions, requiring periodic accompaniments of fire watch personnel during tours by management personnel, and increasing the frequency of quality assurance surveillances of the fire watch program.

Based upon review of the licensee's corrective actions and independent observations of performance, the inspectors determined that fire watch personnel were knowledgeable of their duties and that the fire watch program provided the administrative controls necessary to ensure that required compensatory measures were implemented for fire barrier impairments.

E8.13 (Closed) Inspection Followup Item 50-382/9603-06: Review of Setpoint Change Program for the Condensate Storage Pool

Background

The NRC identified that vortexing had not been included as part of the original design basis for the condensate storage pool level. The design basis and technical specification assumed that at least 170,000 gallons were available to the essential feedwater system from the condensate storage pool prior to shifting to one of the wet cooling tower basins. The NRC noted that the technical specification limiting condition for operation required greater than or equal to an 82 percent level in the condensate storage pool, which equaled approximately 172,700 gallons. The licensee administratively raised the minimum level for the condensate storage pool to greater than 91 percent to account for vortexing. The NRC reviewed the operator logs and noted that the surveillance log had been modified to verify the condensate storage pool level was greater than 91 percent. However, the licensee had not reset the low level alarm setpoint and had not submitted a technical specification amendment request.

Inspector Followup

The inspectors reviewed the licensee's Technical Specification Change Request NPF-38-179 transmitted to the NRC in Letter W3F1-96-0045, dated July 17, 1996. The inspectors noted that the licensee revised Technical Specification Limiting Condition for Operation 3.7.1.3 for the condensate storage pool. The revised limiting condition for operation required a condensate storage pool level of at least 91 percent indicated level or 170,000 gallons of usable volume. The inspectors noted that the licensee also revised the technical specification bases to specify a 91 percent indicated level in the condensate storage pool to account for both vortexing phenomena and instrument uncertainties.

The inspectors reviewed Setpoint Change Package 96-003-0, "Condensate Storage Pool Level: EFWILAC9013A1, A2, and B," dated June 12, 1996. The inspectors noted that the condensate storage pool low level setpoint was revised to an indicated level of 93.25 percent. The inspectors also reviewed Work Authorization Changes 1149557 and 1149566 and found that the condensate storage pool low level alarms for the Outlet Header A and B level indicators were reset.

E8.14 (Closed) Licensee Event Report 50-382/95-006: Failure to Provide Backup Overcurrent Protection Due to Personnel Error

Background

During a review of the technical requirements manual in 1995, the licensee identified two containment electrical penetrations that did not have backup overcurrent protection. Specifically, the A and B containment hydrogen analyzers, which used Electrical Penetrations 141 and 142, respectively, did not have backup overcurrent protection. This condition had existed since a modification was implemented in April 1988 to install a new hydrogen analyzer system. Containment penetration primary and backup overcurrent protective devices were required by Technical Specification 3.8.4.1.

The licensee also identified that after the modification was installed, requirements for inspection and testing of the primary overcurrent devices were not implemented. Technical Specification 4.8.4.1.b required that overcurrent protective devices be subjected to inspection and preventive maintenance at least once per 60 months. The breakers for the containment hydrogen analyzer circuitry had not been tested within 60 months of an initial test in April 1988.

The licensee initiated Condition Reports 95-1282 and 95-1325 and conducted root-cause analysis reviews for failure to have backup overcurrent protection and failure to include primary overcurrent protection in the surveillance program. The root causes identified for each item included deficiencies in the design change process.

These included an inadequate technical review of the proposed design change and inadequate implementation of post-installation surveillance testing requirements.

Immediate corrective actions in response to this event were taken. These included installation of backup overcurrent protection devices (fuses) in the affected circuits and testing the primary breakers to demonstrate their operability. Other corrective actions included implementation of improvements in the design change and 10 CFR 50.59 safety evaluation processes.

Inspector Followup

The inspectors interviewed personnel, reviewed the condition and root-cause analysis reports listed above, and reviewed action item closeout documentation for other action items identified in the licensee event report. Other supporting documentation reviewed included: Site Procedure W1.302, "10 CFR 50.59 Safety Evaluation Guidelines," Revision 0; Site Procedure W2.302, "10 CFR 50.59 Safety and Environmental Impact Evaluations," Revision 3; Site Procedure W4.102, "Design Changes," Revision 4; Administrative Procedure UNT-0070028, "Design Changes," Revision 3; and Design Engineering Procedure NOECP-303, "Design Change Packages," Revision 7.

From review of the above documentation, the inspectors determined that the design change process was revised to require appropriate reviews to determine if the planned change affects the operating license (including the technical specifications), as was the case in the subject event. Once so identified, the safety evaluation process appeared adequate to evaluate the acceptability of the proposed change. Additionally, the revised change process ensured that required surveillance tests for the affected equipment were incorporated into the surveillance testing program.

The inspectors reviewed the significance of the as-found condition. The affected circuitry was low voltage and provided power to the hydrogen analyzer solenoid-operated sample valves. The as-found operability of the circuit breakers was verified by performing a surveillance test when the condition was identified. Therefore, had a fault occurred, the integrity of the containment penetration would have been protected by the breaker. In Condition Report 95-1282, the licensee documented that by engineering judgment, the containment penetrations would have not been impaired given a worst-case fault of the circuit and a failure of the primary protective device. Given the low voltage and limited operating time of the affected circuitry, the inspectors considered this conclusion plausible. However, in the condition report, the licensee stated that a detailed engineering analysis would be performed to support this engineering judgement. The inspectors asked to review the analysis and were informed that the analysis had been performed, but had not been documented or the documentation could not be found. The licensee personnel informed the inspectors that an engineer would be assigned to reperform the analysis. The licensee informed the inspectors that this item had not been

identified as an action item for tracking and documenting its completion. The inspectors considered the failure to document the completion of this item, as identified in the reviewed and approved corrective action document, a weakness in corrective action program implementation. However, based on the low voltage of the circuit and the associated low probability of heat damage to the penetration, the inspectors determined that the failure to document the engineering judgement was not a condition adverse to quality.

Technical Specification 3.8.4.1 required, in part, that primary and backup containment penetration conductor overcurrent protective devices associated with each containment electrical penetration circuit be operable in Modes 1, 2, 3, and 4. Containment electrical penetrations associated with Hydrogen Analyzers A and B did not have operable backup overcurrent protection from approximately April 1988 until December 8, 1995. Additionally, Technical Specification 4.8.4.1.b required, in part, that overcurrent protective devices be subjected to inspection and preventive maintenance at least once per 60 months. The primary overcurrent protective devices for Hydrogen Analyzers A and B did not have the required testing performed at least once per 60 months. These licensee-identified and corrected items are considered a violation of minor significance, consistent with Section VII.B.1 of the NRC Enforcement Policy and, therefore, is being treated as a noncited violation (50-382/97021-01).

An additional part of the licensee's investigation of this event included a review of all other containment electrical penetrations to ensure that they had incorporated the overcurrent protection requirements. During this review, no other containment electrical penetrations without proper overcurrent protection were identified. However, the licensee identified seven inconsistencies in its Technical Requirements Manual, Table 3.8-1, "Containment Penetration Conductor Overcurrent Protective Devices." These were documented in an April 8, 1996, internal memorandum in the electrical engineering design organization. The memorandum identified that charges correcting the seven inconsistencies would be forwarded to the electrical maintenance organization (responsible for maintaining this section of the manual) for incorporation.

The inspectors reviewed the current revision of the technical requirements manual and identified that only two of the identified discrepancies had been changed although there had been ten revisions of the technical requirements manual since the inconsistencies were identified. The inspectors considered all of the identified discrepancies as clearly editorial/typographical in nature except one. The Table 3.8-1 entry for control element drive mechanism cooling units vibration switches indicated the primary device was a fuse, and also indicated no breaker

next to the entry. No surveillance requirements were identified for this device. However, there also was a note associated with this table entry that stated, "Two fused breakers, one each, + and - poles." In addition, the April 8, 1996, memorandum identified that the primary protective device for this circuit was Circuit Breaker CC-EBKR-AB-24 and the backup protective device was a fuse, a position contrary to that in Table 3.8-1.

The system configuration consisted of four vibration switches fed from dc Panel 24 via a single penetration with a single fused breaker for the overcurrent protection devices. The inspectors asked the licensee why the note in the technical requirements manual indicated "two fused breakers." The licensee stated that this was apparently an error. Also, the inspectors asked the licensee why the surveillance test requirements were identified as "NA" (not applicable) for this component. The licensee stated that testing of this breaker was proceduralized in accordance with a maintenance work instruction. The inspectors requested confirmation that this component was included in the surveillance testing program required by Technical Specifications 4.8.4.1.a.2 (which required selecting and functionally testing a representative sample of at least 10 percent of each type of circuit breaker) and 4.8.4.1.b (which required subjecting the circuit breaker to an inspection and preventive maintenance at least once per 60 months).

The licensee provided the inspectors with additional information regarding technical specification compliance. The subject circuit was a 125 volt dc control circuit. The overcurrent protection, as discussed in Updated Final Safety Analysis Report, Section 8.3.1.1.4.g, required double pole fuses or circuit breakers with backup fuses. The licensee informed the inspectors that the subject circuit contained a three-pole molded case circuit breaker, using two poles with a fuse in series with each pole. Due to the high short circuit current (approximately 30000 amperes) in this application, a large fault current limiter (fuse) was required in addition to the normal overload and short circuit fault protection provided by the thermal magnetic portion of the breaker. Therefore, each fuse was both a primary and a backup overcurrent device (double pole fuse arrangement) as allowed by Updated Final Safety Analysis Report, Section 8.3.1.1.4.g. Additionally, since the breaker was not relied upon as a technical specification-required overcurrent protective device, the surveillance requirements of Technical Specification 4.8.4.1.b did not apply. The inspectors agreed with this conclusion but informed the licensee that the above discussion was inconsistent with the conclusion identified in the April 8, 1996, memorandum, which identified the breaker as the primary protective device. The licensee agreed that their original conclusion was incorrect. The inspectors concluded from a review of this issue that there were weaknesses in the licensee's understanding of the design bases of containment penetration overcurrent protective devices and their surveillance testing requirements.

The inspectors asked the licensee why the technical requirements manual had not been updated to reflect the changes identified in the April 8, 1996, memorandum

and were informed that the two items changed had resulted from an unrelated review of the manual by another department. The items identified in the memorandum were not submitted into the technical requirements manual change process due to personnel error. Therefore, no safety evaluations or change packages had been developed for these items.

The technical requirements manual was a controlled document that contained information relocated from the technical specifications in accordance with NRC policy. It was administratively controlled as described in Site Procedure W4.503, "Changes to the Technical Specifications, Technical Requirements Manual, or Core Operating Limits Reports," Revision 4.1. Procedure W4.503 required that desired changes to the technical requirements manual be evaluated under the 10 CFR 50.59 process in accordance with Procedure W2.302, "10 CFR 50.59 Safety and Environmental Impact Screenings," and reviewed by the plant operating review committee. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion V, required, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with these procedures. The failure to update the technical requirements manual in accordance with Procedure W4.503 was identified as one example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-382/9721-02).

Conclusions

A noncited violation was identified for failure to provide backup overcurrent protection for containment electrical penetrations associated with Hydrogen Analyzers A and B and for failure to properly test the primary overcurrent protection devices installed on the same penetrations.

A violation was identified for failure to perform an update of the technical requirements manual in accordance with site procedures after identifying a number of inconsistencies within this document.

E8.15 (Closed) Inspection Followup Item 50-382/96202-10: Adequacy of Valve Fastener Installation

Background

This item involved incorrect fasteners installed on safety-related valves. The valves contained low strength rather than high strength stainless steel bolts as required by the drawings. The fasteners in question were located between the valve bracket and the valve operator connections. The inspectors were concerned that the low strength bolts may have been overtorqued if torqued to the specified high strength bolt torque. The inspectors were also concerned that the licensee had not qualified the incorrect bolts for the safety-grade application in which they were installed.

Inspector Followup

The licensee initiated Condition Report 96-1528 to investigate this concern. The licensee eventually field examined fasteners on all safety-related motor-operated valves, all but 40 of 213 safety-related air-operated valves, the emergency diesel generators, motor terminal box fasteners, electrical mounting hardware, and mechanical supports and mounting hardware. Although a number of deficiencies were identified, none were considered to affect the operability of the associated equipment. Based on this finding, the licensee determined that the fastener discrepancies were not safety significant. Corrective actions included a briefing followed by formal training of mechanical maintenance personnel concerning proper handling of fasteners, the replacement of non-carbon steel fasteners found in critical applications on motor-operated valves with Grade 5 carbon steel fasteners, the replacement of all safety-related motor-operated valve fasteners with the vendor-specified fasteners, and various procedure changes.

The fastener discrepancies fell into three categories: missing lock washers, missing fasteners (bolts, studs, nuts), and fastener material differences (stainless, brass). For each category, the licensee developed root causes and formulated corresponding corrective actions. The inspectors reviewed this material and considered the root causes and corrective action plans to be satisfactory.

The licensee determined that a large percentage of the fastener discrepancies were associated with equipment received from the vendor or from original construction, rather than with errors made by licensee personnel.

Subsequent to this finding, the licensee conducted a training session for all mechanical maintenance personnel concerning the proper use of fasteners. The inspectors reviewed Lesson Plan W-3-LP-GMAD-0007, Revision 0, and felt that it adequately covered the subject matter pertinent to this finding. The inspectors reviewed the list of attendees and examination scores for this training, which was conducted in March and April of 1997.

The inspectors concluded that the licensee had comprehensively addressed the fastener problems and had taken actions to prevent a recurrence of the problem.

E8.16 (Closed) Violation 50-382/9710-01: Four Examples of a 10 CFR Part 50, Appendix B, Criterion III, Design Control Violation

Background

The NRC identified four examples of a 10 CFR Part 50, Appendix B, Criterion III, design control violation. The four examples were as follows:

1. The licensee failed to translate the vendor design requirements for cold weather operation of the wet cooling tower into System Operating Procedure OP-008-01, "Auxiliary Component Cooling Water," Revision 10. The NRC noted that the vendor technical manual required that the wet cooling tower not be operated without at least 30 percent heat load when the inlet wet bulb temperature was below 35 degrees F. The licensee determined that the wet cooling tower fans would not automatically start on high temperature without at least a 30 percent heat load. However, procedures did not include adequate instructions to limit manual operation during cold weather. The NRC noted that the licensee installed caution cards on the system controls to include appropriate cold weather controls.
2. The licensee failed to translate the design requirements for seismic qualification into Maintenance Procedure MM-008-01, "(Inside) Maintenance Access Hatch and (Outside) Maintenance Access Hatch Shield Door Opening, Inspection and Closing," Revision 5, which was the installation instruction for the reactor shield building door. This procedure did not include instructions that would assure that the reactor shield building door would be installed in a seismically qualified configuration. The licensee determined that the reactor building shield door was not installed according to the design drawing. The design drawing required the installation of four 1-1/4 inch bolts to hold the door in place. These bolts were credited as seismic restraints. Only one of four bolts was installed; however, the licensee was able to show that the as-found configuration was operable.
3. The licensee failed to establish adequate measures for the identification and control of design interfaces and for coordination among participating design organizations. Specifically, the licensee failed to provide adequate coordination between the mechanical and the electrical design organizations on three occasions:
 - a. The emergency diesel generator load calculation and the associated Final Safety Analysis Report Table were not updated when Licensing Document Change Request 96-0161 added the manual start of a fuel pool cooling pump 12 hours after a loss-of-offsite power with a safety injection actuation signal to procedures.
 - b. The emergency diesel generator load calculation and the associated Final Safety Analysis Report Table were not updated when Mechanical Calculation MN(Q)-9-9, "Wet Cooling Tower During a LOCA,"

Revision 3, Change 1, paragraph 5.2, changed the operating time of the wet cooling tower fans. The calculation showed that half of the fans operated for 5 days, and the other half operated for 27 hours. The Final Safety Analysis Report and the diesel generator load calculation showed all of the wet cooling tower fans operating only 25 hours.

- c. The emergency diesel generator load calculation and the associated Final Safety Analysis Report Table were not updated when licensing Document Change Request 96-0161 changed the length of time that the auxiliary component cooling water system was required to be in service following a large break loss-of-coolant accident. The licensing document change request changed the Final Safety Analysis Report to indicate that the auxiliary component water system was not required after 5 days rather than the previous 7-day requirement. The diesel generator load calculation showed auxiliary component cooling water system was required for 7 days.
4. The licensee had not assured that the requirements of General Design Criterion 34 were correctly translated into specifications for the emergency feedwater system, which was credited as a residual heat removal system. Specifically, Calculation EC-M96-004, "Design Basis Reconstitution for EFW Flow Rate," Revision A, had not been analyzed for offsite electric power system operation (assuming onsite power was not available). The licensee did not fully evaluate the feedwater line break accident assuming offsite power was available.

Inspector Followup

The inspectors reviewed the licensee's response to the violation documented in Letter W3F1-97-0178, dated August 14, 1997. The licensee stated that the root cause of Example 1 was inadequate procedures and instructions. The inspectors reviewed Procedure OP-002-001, "System Operating Procedure Auxiliary Component Cooling water," and determined that the procedure was revised to include a precaution for the wet cooling tower fans. The caution stated that the wet cooling tower fans should not be operated in manual with outside ambient air bulb air temperature less than or equal to 40°F unless auxiliary cooling water flow through the tower was isolated. The inspectors also reviewed Procedure OP-903-001, "Surveillance Procedure Technical Specification Surveillance Logs," Revision 19. The inspectors determined that this revision instructed the control room staff not to run the wet cooling tower fans in manual with outside air temperature less than 40°F. The licensee stated that since the wet cooling tower fans started when the basin water temperature was greater than 84°F, operation of the fans in automatic would ensure the 30 percent heat load requirement was met. The inspectors determined that the licensee's corrective actions were adequate.

In the licensee's response letter, the licensee stated that the root cause of Example 2 was inadequate procedures and instructions. The instructions for placement and removal of the holddown bolts were never incorporated into the maintenance procedure although required by design drawings and specifications. The inspectors reviewed Procedure MM-008-001, "Maintenance Procedure (Inside) Maintenance Access Hatch and (Outside) Maintenance Access Hatch Shield Door Opening, Inspection and Closing," Revision 6. The inspectors determined that the procedure was revised to include instructions that assured that opening, closing, and securing the maintenance hatch shield door addressed seismic concerns. The inspectors determined that the licensee's corrective actions were adequate.

In the response letter, the licensee stated that the root cause for Example 3 was inadequate procedures and instructions. The licensee stated that Procedure NOECP-011, "Performance of Calculations," did not require engineering personnel making calculation revisions to research all licensing basis documents that might be affected by the change. The inspectors reviewed Calculation EC-E90-006, "Emergency Diesel Generator Loading and Fuel Oil Consumption," Revision 2, Change 12. The inspectors determined that the licensee had revised the calculation to include the loading corrections noted in Example 3 of this violation. The inspectors reviewed Engineering Procedure NOECP-011, "Performance of Calculations," Revision 3. The inspectors determined that the procedure was revised to require the calculation preparer to consider the effects of the calculation on design and licensing basis documents. In the response letter, the licensee stated that the FSAR Table 8.3-1, "Emergency Diesel Generator A Loading Sequence," would be revised by November 30, 1997. The inspectors determined that the licensee's corrective actions were adequate.

The inspectors noted that the root cause of Example 4 of the violation was the failure to consider four reactor coolant pumps running when calculating the minimum acceptable feedwater flow rates. The inspectors reviewed Procedure NOECP-011, "Engineering Calculations," Revision 4. The inspectors determined that the revised procedure contained guidance on the required review for vendor calculations. The procedure required that the design inputs and assumptions were reviewed. The inspectors reviewed Calculation EC-S97-016, "WSES 3 Analysis of 575 gpm EFW Flow for FWLB and LOCA Events with the Inclusion of RCP Heat," Revision 0. The purpose of the calculation was to analyze FSAR Chapter 15 heatup events by including the reactor coolant pump in determining the impact of emergency feedwater flow on reactor coolant system pressure, pressurizer fill, operator action, and long-term cooling. The inspectors determined that the calculation determined that 575 gpm of emergency feedwater flow was sufficient to keep the reactor coolant system pressure below the acceptance criteria with adequate time for operator action. The inspectors determined that the licensee's corrective actions were adequate.

The inspector determined that the licensee's corrective actions for the four examples of the violation were adequate to preclude recurrence.

EB.17 (Closed) Violation 50-382/9710 02: Failure to Provide an Adequate Design Basis in Their Safety Evaluation that a Change in Diesel Generator Fuel Oil Margin Did Not Involve an Unreviewed Safety Question

Background

The NRC noted that Licensing Document Change Request 93-0091 included a Final Safety Analysis Report change that deleted a commitment to ANSI N195-1976 with respect to sizing of the fuel oil storage tank. The NRC noted that the licensee's 10 CFR 50.59 safety evaluation stated that the change did not affect the design as specified in technical specification bases. However, the bases section stated that the minimum required volume of emergency diesel generator fuel was based on conformance with Regulatory Guide 1.137, October 1979, that endorsed the ANSI standard. Implementation of Licensing Document Change Request 93-0091 resulted in a 10 percent reduction in the required fuel oil storage capacity as specified in the technical specification bases. The NRC considered this deletion to be a 10 percent reduction in the required fuel storage capacity.

The NRC noted that Licensing Document Change Request 93-0091 was approved on December 10, 1994. On January 28, 1993, the licensee had submitted the request for Technical Specification, Amendment 92, which clarified that the limiting condition for operation for diesel generator storage requirements was based on load dependent calculations in conformance with Regulatory Guide 1.137, October 1979. However, Technical Specification, Amendment 92, was not issued until March 16, 1994, after the safety evaluation was approved.

In the safety evaluation for Licensing Document Change Request 93-0091, the licensee determined that the proposed changes did not increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the safety analysis report. The NRC noted that the licensee did not address the reduction in required fuel oil storage margin and the associated increase in probability that the emergency diesel generator would run out of fuel before 7 days because of uncertainties associated with the time-dependent load calculation. The NRC determined that the licensee's 10 CFR 50.59 written safety evaluation did not provide an adequate basis that the change did not involve an unreviewed safety question.

Inspector Followup

The inspectors reviewed the licensee's response Letter W3F1-97-0178, dated August 14, 1997, and noted that the licensee stated that compensatory measures had been established to insure that the emergency diesel generators would have

sufficient fuel oil for the diesels to run for seven days and that an additional 10 percent margin was available. The letter stated that these compensatory measures would be implemented until a permanent plan was put in place to resolve the fuel oil storage volume, fuel oil quality requirements, and the deviation from ANSI N195. The inspectors reviewed Procedure EP-002-100, "Emergency Plan Implementing Procedure Technical Support Center Activation, Operation and Deactivation," Revision 25. The inspectors determined that this procedure contained the licensee's compensatory measures for insuring sufficient fuel oil for the emergency diesel generators. The plan included ordering emergency fuel from offsite vendors, replenishing the emergency diesel generator fuel oil storage tanks from the auxiliary boiler fuel oil storage tank, cross-connecting the emergency diesel generator fuel oil storage tanks, and re-energizing nonessential loads. The measures also required that the needed equipment was available onsite to facilitate the transfer of fuel oil between onsite sources.

The inspectors noted that there was a requirement for a minimum level of fuel oil in the auxiliary boiler fuel oil tank and chemistry requirements for the fuel oil. The inspectors reviewed the Technical Requirements Manual, Section 3/4.8.1, and noted that the licensee added this section to be sure that the auxiliary boiler fuel oil storage tank would have level maintained at greater than or equal to 22 percent of full tank level. The inspectors noted that surveillance requirements included verifying the level in the auxiliary fuel oil tank at least once per 31 days, verifying that all required equipment was available for the transfer of fuel oil between the auxiliary boiler tank and the diesel fuel oil storage tanks, and verifying the chemistry of the fuel oil in the auxiliary boiler fuel oil storage tank was the same as the emergency diesel generator fuel oil storage tank.

The inspectors reviewed Procedure CE-001-004, "Periodic Analysis Scheduling Program," Revision 11, and determined that the procedure was revised to require the same requirements for periodic tests of the fuel oil in the auxiliary boiler tanks as in the emergency diesel generator fuel oil storage tanks. Procedure CE-003-700, "General Grab Sampling Techniques," Revision 10, was also revised to add a method for sampling the auxiliary boiler diesel fuel oil storage tank. The inspectors reviewed Work Authorization Task 022210, which insured that the emergency diesel generator fuel oil transfer contingency plan minimum inventory equipment requirements were met. The inspectors determined that the compensatory measures were adequate until a long-term solution was completed.

For long-term corrective actions, the licensee stated that they would resolve the fuel oil storage issues and would implement the solution prior to Operating Cycle 10 operation.

Although the long-term actions were not completed, the inspectors determined that the licensee's compensatory corrective actions were adequate and would remain in

place until the long-term actions are completed. Therefore, the safety concern was resolved and this issue was considered closed.

E8.18 (Closed) Violation 50-382/9710-04: Two Examples of Not Adequately Implementing Technical Specification Surveillance Requirements

Background

The NRC identified two examples of a violation where the licensee did not adequately implement technical specification surveillance requirements. Specifically:

1. The licensee did not verify that the pressurizer heater group circuit breakers opened as required and load shed during the simulated loss-of-offsite power test or the loss-of-offsite power in conjunction with the safety injection actuation signal test.
2. The licensee did not verify the following loads were shed from their bus and restarted on their corresponding load sequencer block: the Shutdown Heat Exchanger A and B room coolers, the Component Cooling Water Heat Exchanger A and B room coolers, Control Room Heater ECH-34, and Switchgear Room Heater ECH-36.

Technical Specification 4.8.1.1.2.e, "Electrical Power Systems Surveillance Requirements," required that each diesel generator be demonstrated operable at least once per 18 months during shutdown by simulating a loss-of-offsite power both with and without a safety injection actuation signal verifying load shedding from the emergency busses, and verifying that the diesel generator reenergized the necessary shedded loads through the load sequencer.

Inspector Followup

In the response to this violation and to Generic Letter 96-01, the licensee performed a comparison of electrical schematics against plant surveillance test procedures to ensure that logic circuitry, interlocks, bypasses, and inhibit circuits were adequately covered in surveillance tests and technical specifications. The licensee identified nine surveillance procedures there were deficient in their test methods. In the response to the violation, the licensee stated that special test procedures were performed during Refueling Outage 8 to test the components. The licensee also stated that the revisions to the applicable procedures were in progress and would be completed by October 30, 1997. The inspectors reviewed seven work authorizations and special test procedures and verified that all intended special tests were performed during Refueling Outage 8.

The inspectors reviewed Procedures OP-903-116, "Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test," Revision 5; OP-903-115, "Train A Integrated Emergency Diesel Generator/Engineering Safety Features Test," Revision 4; and OP-903-028, "Pressurizer Heater Emergency Power Supply Functional Test," Revision 4. The inspectors determined that Procedure OP-903-028 was revised to ensure the pressurizer heater group circuit breakers opened as required and the heaters load shed during the simulated loss-of-onsite power in conjunction with the safety injection actuation signal test. During the review of Procedures OP-903-115 and OP-903-116, the inspectors determined that the procedures were revised to verify proper operation of the loads identified in example two of the violation. The licensee stated that these loads had been successfully tested during Refueling Outage 8.

The inspectors determined that the licensee's corrective actions were adequate for the resolution of this violation.

E8.19 (Open) Violation 50-382/9710-06: Two Examples of Failing to Identify and Correct Significant Conditions Adverse to Quality

Background

The NRC identified two examples of a 10 CFR Part 50, Appendix B, Criterion XVI, corrective action violation, as follows:

1. The licensee did not correct the deficient design basis for tornado protection of the ultimate heat sink and, as a result, did not identify and correct unprotected electrical conduit and cables.
2. The licensee did not promptly identify and correct nozzle ring setting deficiencies on Crosby relief valves, similar to those described in Information Notice 96-24, "Nozzle Ring Settings on Low Pressure Water Relief Valves."

Inspector Followup

To resolve Example 1 of the violation, the licensee relocated the safety-related cable necessary to safely shut down the plant after a tornado, to a location where it was missile protected. However, the licensee did not relocate other safety-related cable. The licensee stated that the 10 CFR 50.59 evaluation and relevant calculation could not be located. Therefore, the inspectors were unable to close Example 1 of the violation pending the licensee locating or regenerating the evaluation.

The inspectors reviewed the licensee's response to the violation documented in Letter W3F-1-97-C178, dated August 14, 1997. The licensee concluded that the root cause for Example 2 of the violation was inadequate procedures based on an industry-wide general lack of knowledge regarding Crosby relief valves. The

inspectors reviewed Maintenance Procedure MM-007-001, "Safety and Relief Valve Bench Testing," Revision 6. The inspectors found that the procedure was revised to give specific instructions for the various types of relief valves to determine proper blowdown settings. The inspectors noted that the licensee provided sketches of the various valves in the procedure to aid maintenance personnel in setting the rings. The inspectors reviewed Crosby's Technical Manual I-1195, Revision 3, which was used by site personnel when performing maintenance, and determined that this document provided instructions on how to properly adjust the blowdown rings following valve rework. In addition, the inspectors reviewed Administrative Procedure UNT-005-015, "Work Authorization Preparation and Implementation," Revision 5, and determined that the procedure was revised to require the safety and relief valve engineer to review work authorizations when work was to be performed on components in the safety and relief valve program. The licensee inspected and adjusted all Crosby relief valves having ring positions that were in question. The inspectors determined that the licensee's corrective actions for Example 2 of the violation were adequate to preclude recurrence.

C8.20 (Open) Violation 50-382/9714-01: Failure to Update Safety Analysis Report

Background

This item involved a failure to perform a timely update of the Final Safety Analysis Report in May 1996. This update included three discrepancies: (1) an error in Updated Final Safety Analysis Report, Table 9.2-1, showing component cooling water pump motor capacity as 3000 instead of 300 horsepower, (2) an error in Updated Final Safety Analysis Report, page 8.1-2 that indicated an incorrect number of circuit breakers connecting the swing AB bus to the A or B bus, and (3) an error in Technical Specification Basis, Section 3/4.7.1.2, which incorrectly stated that the electric-driven emergency feedwater pump was capable of delivering 350 gpm at 1163 psig at the steam generators instead of at the discharge of the pump. The NRC did not require a response to the violation based on corrective actions developed during the inspection.

Inspector Followup

The inspectors discussed with the licensee the corrective actions applied to the three noted examples and also, from a generic perspective, the actions taken to correct and prevent the reappearance of other similar disparities within the Updated Final Safety Analysis Report, or technical specifications. The inspectors verified that the three noted errors were corrected. The licensee assembled a root-cause analysis team to investigate Updated Final Safety Analysis Report, inaccuracies. In this investigation, documented within Condition Report 96-0619, the root-cause analysis

team found 27 condition reports involving Updated Final Safety Analysis Report discrepancies, which were then reviewed to determine how they occurred. The root-cause analysis team identified four major causes of the problems, including procedure compliance, administrative controls, training and qualification, and management oversight.

To address each root cause, the root-cause analysis team formulated a detailed corrective action plan that included numerous procedural revisions and training sessions. The inspectors reviewed the correction action plan and noted that it appeared to address the root cause areas comprehensively. Deadlines for completion of each item were in place, most of which were before June 1997 though some long-term items had completion dates as late as November 1999.

The inspectors concluded that the licensee had satisfactorily addressed the issue of Updated Final Safety Analysis Report, discrepancies as it pertained to this violation.

The violation also addressed an error in the technical specifications and the inspectors inquired as to whether a generic review of the technical specifications had been performed. The licensee stated that in its response to NRC Inspection Report 50-382/97-10, dated August 14, 1997, a plan to address the accuracy of the technical specification bases was presented. In this letter, the licensee stated its intent to "perform a full conversion to the new Combustion Engineering Standard Technical Specification (CE-ST5, NUREG-1432)." This improvement was to involve a reconstitution of the technical specification design and licensing bases. The letter also stated an intent to perform a review of applicable technical specification procedures and make necessary enhancements to ensure the elements of a technical specification basis control program and a technical specification safety function determination program as specified in the Combustion Engineering standard technical specifications are clearly documented. Within the licensee's commitment tracking system, these actions were scheduled to be completed by June 30, 1998. This item will remain open pending completion of these actions by the licensee.

E8.21 (Closed) Licensee Event Report 50-382/97-02: Common Mode Failure of Shutdown Cooling

Background

On December 20, 1996, the licensee declared the shutdown cooling heat exchanger inlet and outlet valves (SI-125B and SI-412B) inoperable because of nitrogen voiding in the piping that could cause pressure locking in the valves. On December 22, 1996, the licensee declared these valves operable after installing bonnet pressure relief devices. On January 27, 1997, the licensee discovered nitrogen voiding of the corresponding "A" train and declared Valves SI-125A and SI-412A inoperable. Consequently, the licensee determined that a common mode failure of both trains of shutdown cooling may have existed prior to the December 1996 event. However,

engineering was unable to conclude that pressure locking of these valves would have occurred with the nitrogen bubble present. The licensee installed pressure relief devices on the bonnets of Valves SI-125A and SI-412A on January 30, 1997, and subsequently declared these valves operable. The licensee determined that the source of the nitrogen was leakage from the nitrogen-blanketed safety injection tanks. The nitrogen was able to come out of solution because of the lower pressure in the shutdown cooling system.

The licensee performed the following additional corrective actions:

- * System engineering initiated a monitoring program to determine the extent of nitrogen intrusion into the system.
- * Operations were tasked with maintaining the refueling water storage pool above 93 percent, to be consistent with engineering analysis assumptions.
- * The licensee committed to perform a review of its response to Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," to ensure that the conclusions and calculations contained therein remained valid.
- * Vent lines were installed at the high points on the containment penetrations where nitrogen intrusion was occurring.

Inspector Followup

The inspectors reviewed work order documents used to install the high point vents and observed that the refueling water storage pool level was being maintained above 93 percent by means of the nuclear plant operator turnover sheet and checklist. In discussions with the licensee, the inspectors learned that on a monthly basis the extent of nitrogen intrusion is checked using ultrasonics and, if any evidence of nitrogen is found, the newly-installed vent lines are opened to return the system to a water-solid condition. To date, these inspections have generally found no nitrogen. However, on September 30, 1997, the licensee found one line that contained a small amount of nitrogen. This line was vented and placed on a weekly surveillance frequency. On October 6, 1997, during the next surveillance, this line was found to be water solid (no nitrogen). The licensee stated that the presence of any nitrogen in the line is considered to be a basis for declaring the train inoperable. The inspectors considered the current ultrasonic testing and subsequent venting on a monthly (or more frequent, if necessary) basis to be an excellent means of precluding recurrence of this problem.

As discussed above, the licensee performed a review of its response to Generic Letter 95-07 to determine if the response was affected by the conditions described in this event. The only other priority valves (other than the subject valves of the

licensee event report) that were considered susceptible to pressure locking in the Generic Letter 95-07 response were SI-331A(B) and SI-332A(B), safety injection tank isolation valves. The licensee determined that none of these valves were subject to nitrogen gas intrusion and that, in addition, no other safety-related power-operated gate valves in the plant were subject to this phenomenon.

The inspectors determined that the licensee had adequately addressed the issues associated with this event.

E8.22 (Closed) Licensee Event Report 50-382/97-11, Revision 0 and Revision 1; Containment Spray Water Riser Level Less Than Required Due to Instrument Uncertainty

Background

The licensee discovered that the water level in the containment spray risers could have been less than that required by technical specifications. Because of a failure to consider the effects of the controlled ventilation system on the indicated level and instrument uncertainties, the licensee was maintaining the containment spray risers at or above a level that was potentially 7.43 feet below the minimum level assumed in the accident analysis. The licensee reperformed this analysis and determined that the peak containment pressure would still have remained less than the design value of 44 psig by a margin of 0.43 psig. As immediate action, the licensee raised indicated level in both trains of containment spray to above the level adjusted for uncertainties. The licensee initiated Condition Report CR-97-0682 and Procedure OP-903-001, "Technical Specification Surveillance Logs," was changed to reflect a revised indicated water level. The licensee also replaced the containment spray riser level gauges with new gauges that offered increased accuracy.

Inspector Followup

The inspectors reviewed the Condition Report CR-97-0682 associated with this event. The inspectors verified that Procedure OP-903-001 had been revised as stated by the licensee. The inspectors questioned the licensee concerning their generic review of technical specification surveillances, being performed by three contractors, to determine if other instances of the same failure to consider instrument error existed. Although the official completion date of the effort was June 1998, the licensee was attempting to have it completed by the end of 1997. The inspectors reviewed the work scope description and concluded that it was broad in scope and appropriate to the circumstances.

The licensee replaced the original riser gauges with new gauges of increased accuracy, as documented in Work Authorizations 01159013 and 01159014. The inspectors reviewed these packages and verified their completion.

The inspectors reviewed Calculation EC-191-027, Revision 0, performed in 1991, that determined a maximum positive (indicated greater than actual) error of 9 feet 5 inches. In 1997, the licensee revised this calculation to Revision 1 and 2 (which addressed the new riser gauges), and included a term for a density effect of the water in the riser piping (a function of temperature and boron concentration) that had not been included in the original calculation (Revision 0, which addressed the original riser gauges). The inspectors noted that the additional term for density effects applied a biased effect of 1.6 feet (indicated greater than actual level), and wondered whether the licensee event report assumptions concerning peak pressure for the old gauges would still be valid if the density effect were considered in the Revision 0 calculation. The licensee stated that changes to other assumptions in the original calculation would probably offset the increase in uncertainty added by the density effects, but had not actually undertaken this effort to confirm the assumption. The inspectors considered the lack of consideration of density effects in the original calculation to constitute a condition adverse to quality, in that it was a source of error that should have been considered, and for which its exclusion in this one instance, could imply its possible exclusion from other level instrument calculations.

During a telephone conference call conducted on October 17, 1997, the licensee stated that, in response to the NRC concern, the Revision 0 of Calculation EC-191-027 had been revised to include the density error. However, because of conservatism in other assumptions that were removed, the overall error did not increase. The licensee also stated that they reviewed all other level instrument error calculations (24 total) and found that these calculations correctly applied the density term. These two steps were an essential response to the original finding but were not previously performed because of the failure to initiate a condition report.

10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, and drawings.

Procedure W2.501, "Corrective Action," Revision 6, states that an individual who identifies a condition adverse to quality shall initiate a condition report.

The licensee's failure to initiate a condition report in response to the discovery of a failure to consider water density affects in Calculation EC-191-027, Revision 0, was identified as a second example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-382/9721-02).

Conclusions

A violation was identified for failure to issue a condition report upon discovery of an error in a calculation associated with the containment spray riser level gauge.

EB.23 (Closed) Licensee Event Report 50-382/97-013: Refueling Machine Failed to Meet Technical Specification Requirements

Background

The licensee determined that the refueling machine's fuel mast and control element assembly mast had elevation dependent zones during extension and retraction of the hoist assemblies, which did not have overload protection provided. For both masts, interlocks were temporarily bypassed at certain elevation dependent load transition points. Technical Specification 3/4.9.6 required both the fuel mast and control element assembly mast to have operable overload features and did not contain exceptions for load transition points. Also, Surveillance Procedure OP-903-073, "Refueling Machine Operability Check," Revision 7, Change 2, which validated the minimum lift capacity of the control element assembly hoist was inadequate because it did not verify hoist minimum load capacity.

Followup

To address the procedural deficiency, the licensee revised Procedure OP-903-073 to change the method in which the control element assembly minimum lift capacity was tested. The inspectors reviewed this procedure revision and found that the stated changes had been made.

To address the overload bypass problem, the licensee revised the software controlling the overload protection features to provide an overload limit that conformed with Technical Specification 3/4.9.6. The new software eliminated the unintentional bypass feature of the old software, and provided a full-travel overload limit. The inspectors concluded that the licensee had taken sufficient actions to correct the problems associated with this event.

This event constituted a violation of Technical Specification 3/4.9.6, for failure to provide adequate overload protection for the refueling machine and a violation of 10 CFR Part 50, Appendix B, Criterion V, for failure to provide an adequate procedure to test the control element assembly minimum lift capacity. Because both violations were identified by the licensee, constituted minor safety concerns, and were adequately corrected by the licensee, these violations were classified as noncited in accordance with Section VII.B.1 of the NRC Enforcement Policy (50-382/9721-03).

Conclusions

A noncited violation was identified for failure of the refueling machine to meet technical specification requirements concerning overload protection and for failure to have an adequate surveillance procedure to test the control element assembly mast minimum load capacity.

E8.24 (Closed) Licensee Event Report 50-382/97-024: Emergency Diesel Generator Autostart Due to Start-up Transformer Failure

Background

On May 28, 1997, during a refueling outage, a loss-of-offsite power occurred in the B offsite power system due to a failure of Startup Transformer B. Emergency Diesel Generator B started and loaded as designed. Shutdown cooling was maintained with Shutdown Cooling Train A, which continued to receive offsite power. Offsite power was restored to Train B on May 29, 1997, by backfeeding power through Main Transformer B and Unit Auxiliary Transformer B. The autostart of the emergency diesel generator was reported as a voluntary licensee event report. The report was not required according to 10 CFR 50.73 because the emergency diesel generators were not categorized as engineered safety features in the licensing basis of the Waterford 3 facility. Title 10 CFR 50.73 only required reporting autostarts of engineered safety features.

The licensee conducted inspections and tests of the failed transformer and determined that it failed as a result of damage to the insulation of the C-phase secondary windings. A temporary replacement transformer was installed pending refurbishment of the failed transformer. The licensee received the permanent replacement transformer after completion of the refueling outage and intended to install it during the next refueling outage.

Inspector Followup

The licensee event report identified that the temporary replacement startup transformer had a wye-to-wye winding configuration, whereas, the original transformer had a wye-to-delta configuration. This resulted in a 30-degree phase shift between the startup and unit auxiliary transformers, prohibiting switching between them. Therefore, the licensee configured the electrical system to use the startup transformer to provide power to the onsite electrical distribution system (from offsite power) instead of the unit auxiliary transformer (from the main generator).

The inspectors reviewed the Updated Final Safety Analysis Report, Section 8.1.2, and determined that the current plant configuration during normal operations was different from that described in the Updated Final Safety Analysis Report.

Section 8.1.2 of the Updated Final Safety Analysis Report stated, "The Plant Electric Power Distribution System receives power under normal operating conditions from the main generator through two unit auxiliary transformers." Under the current configuration, power was provided from an offsite power source. The inspectors reviewed Temporary Alteration Request 97-016, "Start-up Transformer B Replacement," to ensure that the associated 10 CFR 50.59 evaluation addressed this issue and that technical specification requirements for offsite power availability were maintained. The inspectors' review of the alteration package indicated that the alteration was adequately evaluated. The inspectors also verified through a control room walkdown and interviews with operators that implementation of the temporary alteration and its resultant change in system operation requirements were adequate.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management during an exit meeting conducted on October 20, 1997, by telephone. The licensee acknowledged the inspection findings but indicated possible disagreement with an example of Violation 50-382/9721-02, which was discussed in Section E8.22 of this report. During the exit meeting, the licensee indicated a disagreement with this violation, stating that the engineers assumed that the effect of this error would not result in an adverse condition. Further, the licensee stated that their subsequent review confirmed that the engineer's assumptions were correct.

The inspectors asked the licensee whether any materials examined during the inspection were proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Viener, Supervisor, Design Engineering-Mechanical
C. Thomas, Licensing Supervisor
M. Brandon, Licensing Supervisor
R. Douet, Maintenance Manager
T. Gaudet, Licensing Manager
E. Ewing, Director, Nuclear Safety and Regulatory Affairs
A. Wrape, Director, Design Engineering
P. Gropp, Manager, Design Engineering, Electrical/Instrumentation and Control
R. O'Donnell, Supervisor, Design Engineering, Electrical/Instrumentation and Control
D. Vinci, Plant Engineering Manager
D. Matthews, Licensing Specialist

NRC

G. Pick, Project Engineer

INSPECTION PROCEDURES USED

92903 Followup of Engineering Issues

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|----------------|-----|--|
| 50-382/9721-01 | NCV | Failure to Provide Backup Overcurrent Protection |
| 50-382/9721-02 | VIO | Failure to Follow Procedures |
| 50-382/9721-03 | NCV | Refueling Machine Failed to Meet Technical Specifications Requirements |

Closed

| | | |
|--|-----|---|
| 50-382/9325-02 | IFI | Fail to Revise Design Documents |
| 50-382/9325-04 | IFI | Review of Peir Process |
| 50-382/9335-01 | VIO | Inadequate Design Control |
| 50-382/94C7-01 | IFI | Vendor Information |
| 50-382/9426-01 | VIO | Failure to Update Station and Management System |
| 50-382/9426-02 | IFI | Update Procedures/Venting instructions |
| 50-382/9426-03 | IFI | Engineering Initiatives |
| 50-382/9511-01 | IFI | Fire Alarm Annunciator Response Procedure |
| 50-382/9513-04 | IFI | Failure to Confirm Operability of Solenoid Valves |
| 50-382/9520-01 | IFI | Requirements for Continuous Fire Watch |
| 50-382/9520-02 | VIO | Fail to Implement Fire Protection Program Fire Watch Procedure |
| 50-382/9603-06 | IFI | Review Setpoint Change Program |
| 50-382/9623-04 | IFI | Inspection of Emergency Diesel Generators Air Receiver |
| 50-382/95-006 | LER | Fail to Provide Backup Overcurrent Protection |
| 50-382/96202-10 | IFI | Adequacy of Fastener Installation |
| 50-382/9710-01 | VIO | Design Control Violation |
| 50-382/9710-02 | VIO | Diesel Generator Fuel Oil Margin |
| 50-382/9710-04 | VIO | inadequate Implementation of Technical Specifications |
| 50-382/97-002 | LER | Potential Common Mode Failure of Shutdown Cooling |
| 50-382/97-011-00 and 50-382/97-011-01 | LER | Core Spray Water Less Than Required Due to Instrument Uncertainty |
| 50-382/97-013 | LER | Refueling Machine Failed to Meet Technical Specification Requirements |
| 50-382/97-024 | LER | Emergency Diesel Generator Auto Start Due to Start-up Transformer Failure |

50-382/9721-01 NCV Failure to Provide Backup Overcurrent Protection

50-382/9721-03 NCV Refueling Machine Failed to Meet Technical
Specification Requirements

Discussed

50-382/9407-02 VIO Failure to Provide Adequate Procedure

50-382/9710-06 VIO Corrective Action Violation

50-382/9714-01 VIO Failure to Update Safety Analysis Report and
Technical Specification Basis Section