UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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August 11, 2004

R. T. Ridenoure
Vice President
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION - NRC INTEGRATED INSPECTION REPORT 05000285/2004003

Dear Mr. Ridenoure:

On June 30, 2004, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station. The enclosed integrated inspection report documents the inspection findings which were discussed on July 7, 2004, with Mr. Ralph Phelps, Division Manager, Nuclear Engineering, and other members of your staff.

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

Based on the results of this inspection, the NRC identified eight findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC also determined that there were violations associated with seven of these findings. These violations are being treated as noncited violations (NCVs), consistent with Section VI.A of the Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violation or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Fort Calhoun Station facility.

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

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

Kriss M. Kennedy, Chief
Project Branch C
Division of Reactor Projects

Docket: 50-285
License: DPR-40

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NRC Inspection Report 05000285/2004003
w/attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	50-285
License:	DPR-40
Report:	05000285/2004003
Licensee:	Omaha Public Power District
Facility:	Fort Calhoun Station
Location:	Fort Calhoun Station FC-2-4 Adm. P.O. Box 399, Hwy. 75 - North of Fort Calhoun Fort Calhoun, Nebraska
Dates:	April 1 through June 30, 2004
Inspectors:	J. Kramer, Senior Resident Inspector L. Willoughby, Resident Inspector D. Carter, Health Physicist N. O'Keefe, Senior Reactor Inspector D. Sterns, Project Engineer
Approved By:	Kriss M. Kennedy, Chief, Project Branch C Division of Reactor Projects

Enclosure

CONTENTS

SUMMARY OF FINDINGS

IR 05000285/2004003; 04/01/2004 - 06/30/2004; Fort Calhoun Station, Integrated Resident and Regional Report; Adverse Weather Protection, Fire Protection, Heat Sink Performance, Nonroutine Events, Problem Identification and Resolution.

The report covered a 3-month period of inspection by Resident and Regional office inspectors. Seven Green noncited violations and one Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A noncited violation of Technical Specification 5.8.1 was identified as a result of Procedure AOP-01, "Acts of Nature," Revision 15, not requiring a visual inspection of the plant and site for structural damage following high winds. As a result, damage to the bus bars from House Service Power Transformer T1A-3 to a safety-related 4 kV bus occurred when a piece of the turbine building facade that was blown off during high winds went unnoticed for approximately 12 hours.

  This finding was more than minor since it was associated with the protection against external factors attribute of the initiating events cornerstone. Using the significance determination process, the finding was characterized as having very low safety significance since it did not contribute to a loss-of-coolant accident, contribute to a reactor trip with a loss of mitigating equipment, nor increase the likelihood of fire or flooding and off-site power remained available (Section 1R01).

Cornerstone: Mitigating Systems

- Green. A noncited violation of Technical Specification 5.8.1.c, Fire Protection Program Implementation, was identified for the failure to implement procedures to ensure that fire barriers protecting safety-related areas were functional. Specifically, between Rooms 62 and 69, gaps and openings existed in a barrier (a hinged metal plate) due to missing angle irons that would have allowed flame propagation between two fire areas.

  This finding was more than minor since it was associated with the protection against external factors attribute of the mitigating systems cornerstone. Using the Significance Determination Process, Manual Chapter 0609, Appendix F, the finding was determined to be in the Fire Confinement category because the fire barrier separated one fire area from another. A moderate degradation rating was assigned because there was defense-in-depth and more than a 20-foot

separation between the degraded barrier and safety-related equipment. Performing the Phase 1 qualitative screening check, the finding was characterized as having very low safety significance since all potential damage targets in the exposed fire area were provided with passive fire barrier protection with no more than a moderate degradation that would provide a minimum of 20 minutes of fire endurance (Section 1R05.1b1).

- Green. A noncited violation of 10 CFR Part 50, Appendix R, was identified as a result of not providing fire protection features for structures, systems, and components important to achieve and maintain cold shutdown or having the capability of repairing these components within 72 hours. Specifically, the licensee did not provide proper cable separation nor the necessary fire protection features for the raw water pump cabling in Manhole 5. In addition, the licensee did not have a procedure and materials available to repair the cabling within 72 hours.

  This finding was more than minor since it was associated with the protection against external factors attribute of the mitigating systems cornerstone. Using the Significance Determination Process, Manual Chapter 0609, Appendix F, the finding was determined to be in the Cold Shutdown category since the raw water pumps are needed to achieve and maintain cold shutdown. A moderate degradation rating was assigned because the concrete partition separating the trains would provide some fire protection. Performing the Phase 1 qualitative screening check, the finding was characterized as having a very low safety significance since it only affected the ability to reach and maintain cold shutdown conditions (Section 1R05.1b2).

- Green. A noncited violation of Technical Specification 5.8.1.c, Fire Protection Program Implementation, was identified for the failure to implement compensatory measures when access to Fire Hose Station FP-7G was blocked by a safety barricade erected to support maintenance. The licensee did not stage a hose of equivalent capacity to service the unprotected areas from an operable hose station.

  This finding was more than minor since it was associated with the protection against external factors attribute of the mitigating systems cornerstone. Using the Significance Determination Process, Manual Chapter 0609, Appendix F, the finding was determined to be in the Fixed Fire Protection Systems category since it affected the manual fixed fire suppression system. The degradation rating of the finding was high because the hose station was not usable. The finding was characterized as having a very low safety significance since it only affected the ability to reach and maintain cold shutdown conditions. This finding had crosscutting aspects associated with human performance (Section 1R05.1b3).

- Green. A noncited violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for failure to follow procedures to address an inadequate Technical

Specification. The inspectors identified two examples where Technical Specification 2.4 was inadequate to assure that the heat removal safety function of the raw water and component cooling water systems was maintained. In 1996, engineering identified that certain river level and/or temperature conditions, in combination with equipment outages permitted by Technical Specification action statements, could result in inadequate heat removal capability during design basis events. In one case, the licensee failed to perform an assessment of the limitations on operability and the adequacy of Technical Specifications to assure those functions, as required by Procedure NOD-QP-31, "Operability Determinations and Safety Analysis for Operability," Revision 20, and Criterion V. Had this procedure been correctly followed, the licensee should have recognized that a Technical Specification change was required. The other example did not involve a violation but did require a change to the Technical Specification. This issue was entered into the licensee's corrective action program under Condition Reports 200401754 and 200401761.

This finding was more than minor because, if left uncorrected, this condition could result in a loss of the heat removal function. The finding affected the mitigating systems cornerstone. The finding was determined to have very low safety significance in a Phase 1 screening because this issue represented a design deficiency that had not resulted in a known loss of function (Section 1R07.2).

- Green. A finding was identified for untimely actions to determine the extent of condition and correct the causal factors for heat exchanger tube pitting in the component cooling water system. The licensee had tentatively attributed the cause of pitting observed in Raw Water/Component Cooling Water Heat Exchangers AC-1A and A-1B tubes (on the component cooling water side) to microbiologically induced corrosion in a 1996 root cause assessment. Since 1996, the licensee had not obtained evidence in the form of biological samples to either support or refute that microbiologically induced corrosion was active in the component cooling water system, determined whether the condition existed in other components in the system, nor taken actions to arrest pitting. In particular, Shutdown Cooling Heat Exchangers AC-4A and AC-4B had material and environmental susceptibilities to microbiologically induced corrosion and had not been inspected in over 20 years to determine the condition of the tubes. This issue has been entered into the licensee's corrective action program under Condition Reports 200401758 and 200401768. This finding was not considered a violation because it could not be determined whether pitting was occurring in unmonitored components. The licensee scheduled inspections of the three most significant heat exchangers for the next refueling outage to address this concern.

  This issue was more than minor because, if left uncorrected, the pitting could become a through-wall leak, which would be a more significant safety concern. The finding affected the mitigating systems cornerstone. The finding was

determined to have very low safety significance in a Phase 1 screening because this issue represented a deficiency that had not resulted in a loss of function (Section 1R07.3).

- Green. A noncited violation of Technical Specification 5.8.1 was identified as a result of maintenance personnel failing to follow documented instructions. These actions caused a control room air conditioning unit to become inoperable while the other unit was already removed from service.

  This finding was considered more than minor since it was associated with the equipment performance attribute of the mitigating systems cornerstone. The loss of the control room air conditioning unit will result in an increase in control room temperature and affect the performance of safety-related equipment in the control room. Using the significance determination process, the finding was characterized as having a very low safety significance because operators restarted the control room air conditioning equipment within approximately 10 minutes of the loss of control room cooling and the control room did not heatup significantly; therefore, all control room equipment remained operable. This finding had crosscutting aspects associated with human performance (Section 1R14).

Cornerstone: Barrier Integrity

- Green. A noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, was identified as a result of the licensee's failure to establish a test program to demonstrate that the backup nitrogen supply systems to the component cooling water inlet and outlet valves to the containment air cooling units would perform satisfactorily. The licensee only performed leak rate testing of the backup nitrogen supply systems with the component cooling water inlet and outlet valves in the closed position and did not leak test the backup nitrogen supply systems with the inlet and outlet valves in the open accident position.

  This finding was more than minor since it affected the containment configuration control attribute of the barrier integrity cornerstone. Using Significance Determination Process, Appendix H, and Table 4.1, the finding was characterized as having a very low safety significance because it was determined to have no impact on core damage frequency or large early release frequency. In addition, the licensee does not credit the containment cooling units for pressure control during a loss-of-coolant accident and only credits one of four containment cooling units in the containment pressure analysis for a main steam line break (Section 4OA2.1).

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

The unit began the inspection period in Mode 4 at midloop conditions in a planned midcycle outage for the replacement of reactor coolant pump seal packages. On April 7, 2004, operators performed a reactor startup and the unit was synchronized to the grid the following day. On April 10 the unit returned to 100 percent power and operated at that power level throughout the remainder of this inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

The inspectors reviewed Procedure OI-EW-1, "Extreme Weather," Revision 8, and Procedure AOP-01, "Acts of Nature," Revision 15, for responding to high winds (one inspection sample). The inspectors evaluated the design features and implementation of the procedures to protect structures, systems, and components from the affects of high winds.

b. Findings

Introduction. A Green, noncited violation (NCV) of Technical Specification 5.8.1 was identified as a result of Procedure AOP-01 not requiring a visual inspection of the plant and site for structural damage following high winds. As a result, damage to the bus bars from House Service Power Transformer T1A-3 to a safety-related 4 kV bus occurred when a piece of the turbine building facade that was blown off during high winds went unnoticed for approximately 12 hours.

Description. On April 18, 2004, at approximately 5 p.m., the licensee entered Procedure AOP-01 because a tornado watch was issued by the National Weather Service. Approximately 3 hours later, a thunderstorm warning was issued. At that time, wind gusts were about 50 miles per hour and continued for approximately 2 hours. The tornado watch expired at approximately 11 p.m. and operators exited Procedure AOP-01. The high winds damaged the turbine building facade such that part of the facade came loose and impacted the duct and bus bars that supplied a safety-related 4 kV bus from House Service Power Transformer T1A-3. The debris damaged the insulation on two phases of the bus bars but did cause any electrical shorts or bus grounds. The licensee was unaware of the damage until approximately 10 a.m. the next morning. Procedure AOP-01 did not direct a visual inspection of the plant and site for structural damage following a thunderstorm watch, thunderstorm warning, or a tornado watch. The only time the procedure directed an inspection of the site for damage was when a tornado was on site or a tornado warning was issued.

Analysis. The inspectors evaluated the safety significance of the finding. This finding was more than minor since it was associated with the protection against external factors attribute of the initiating events cornerstone. Using the significance determination process, the finding was characterized as having very low safety significance since it did not contribute to a loss-of-coolant accident or a reactor trip with a loss of mitigating equipment, nor increase the likelihood of a fire or flooding, and off-site power remained available.

Enforcement. Technical Specification 5.8.1 requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures in Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, Revision 2, Appendix A, step 6.w, requires, in part, procedures for acts of nature. Contrary to the above, the licensee did not establish an act of nature procedural requirement to visually inspect the plant and site for structural damage following high winds absent a tornado warning. On April 19, 2004, the licensee discovered that high winds damaged the turbine building facade such that part of the building became loose and impacted the bus bars from House Service Power Transformer T1A-3 to a safety-related 4 kV bus. The licensee was unaware of the damage for approximately 12 hours since no required inspection for damage was performed. This violation of Technical Specification 5.8.1 is being treated as an NCV, consistent with Section VI. A of the Enforcement Policy (NCV 05000285/2004003-01). This violation is in the licensee's corrective action program as Condition Report 200401507.

1R04 Equipment Alignments (71111.04)

.1 Partial Equipment Walkdowns

a. Inspection Scope

The inspectors performed partial walkdowns (three inspection samples) of the following trains of equipment during outages, operation, or testing of redundant trains. The inspectors verified that the following systems were properly aligned in accordance with system piping and instrumentation drawings and plant procedures:

- Component Cooling Water (CCW) inlet and outlet valves to the containment air cooling units during outage of redundant cooling units on May 14, 2004
- Diesel Generator 2 while Diesel Generator 1 was inoperable for maintenance on June 9, 2004
- Low Pressure Safety Injection Pump SI-1A during an outage of Low Pressure Safety Injection Pump SI-1B on June 28, 2004

b. Findings

No findings of significance were identified.

.2 Complete System Walkdowns

a. Inspection Scope

The inspectors conducted a detailed review of the alignment and condition of Diesel Generator 2 (one inspection sample). To verify system operability, the inspectors reviewed the following: (1) past events and documents regarding the diesel generator performance, (2) open work requests for Diesel Generator 2, (3) Fort Calhoun Station System Report Card for Diesel Generator 2, (4) Updated Safety Analysis Report, and (5) Technical Specifications. The inspectors performed a walkdown of the system to verify that critical valves were aligned correctly and that support equipment such as starting air, cooling water, fuel oil, and lube oil systems were in the proper configuration. The following drawings were used as part of the walkdown: Starting Air B120F07001, Revision 24; Lube Oil B120F03001, Revision 25; Jacket Water B120F04001, Revision 20; and Fuel Oil 11405-M-262, Revision 57.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Fire Inspection Tours

a. Inspection Scope

The inspectors performed routine fire inspection tours (six inspection samples) and reviewed relevant records for plant areas important to reactor safety. The inspectors observed the material condition of plant fire protection equipment, the control of transient combustibles, and the operational status of barriers. The inspectors compared in-plant observations with commitments in the licensee's Updated Fire Hazards Analysis Report. The following fire areas were inspected:

- Fire Area 6.3 - Basement and Personnel Corridor Area (Room 4)
- Fire Area 20.5 - Ion Exchanger Area (Room 62)
- Fire Area 20.7 - Auxiliary Building Ventilation Room Elevation 1025 (Room 69)
- Fire Area 34C - Group 1 MCC Area (Room 57)
- Fire Area 40 - Equipment Hatch Enclosure Area (Room 66)
- Manholes 5 and 31 (Outside Intake Structure)

b. Findings

Three findings of significance were identified.

(1) Fire Barrier Separating Rooms 62 and 69

Introduction. A Green, noncited violation of Technical Specification 5.8.1 was identified for the failure to ensure that all fire barriers protecting safety-related areas were functional. Specifically, between Rooms 62 and 69, gaps and openings existed in a barrier (a hinged metal plate) due to missing angle irons that would have allowed flame propagation between Fire Area 20.5 (Room 62 - Ion Exchanger Area) and Fire Area 20.7 (Room 69 - Auxiliary Building Ventilation Room, Elevation 1025).

Description. Fire Barrier 69-F-24 was a nonrated fire barrier that separated Rooms 62 and 69. The barrier was a personnel hatch for egress into Room 62 from 69 and was constructed of a 5/16-inch thick metal plate. The hatch was secured by hinges on one edge and a hasp on the opposite edge to hold the plate flat against the concrete floor. Engineering Evaluations EA-FC-98-005, “Fire Barrier Evaluation for 86-10 Miscellaneous Penetrations,” Revision 3, and EA-FC-91-112, “Evaluation of the Fire Barrier Separating Rooms 62 and 69,” Revision 2, evaluated the barrier for adequacy in accordance with Generic Letter 86-10. The evaluation indicated that angle irons were used to provide a barrier overlap, thus preventing any openings or gaps for flame propagation. The inspectors identified that angle irons were not placed on two sides of the hatch, thus creating gaps up to 2 inches wide on the sides of the barrier.

Analysis. The inspectors evaluated the safety significance of the finding. This finding affected the mitigating systems cornerstone and was considered more than minor since it affected the cornerstone attribute of Protection Against External Factors. Based on Manual Chapter 0609, Appendix F, the finding was determined to be in the Fire Confinement category because the fire barrier separated one fire area from another. The inspectors assigned a moderate degradation rating since there was defense-in-depth and more than 20 feet of horizontal separation between the degraded barrier and safety-related equipment. The inspectors performed the Phase 1 qualitative screening check and characterized the finding as having very low safety significance (Green) since the existing barrier would protect all safety-related equipment in the exposed fire area for at least a minimum of 20 minutes.

Enforcement. Technical Specification 5.8.1 requires, in part, that written procedures shall be established and maintained for implementation of the fire protection program. Procedure SO-G-102, “Fire Protection Program Plan,” Revision 5, was the governing document for all fire protection program plan implementing procedures and references Procedure SO-G-103, “Fire Protection Operability Criteria and Surveillance Requirements,” Revision 16, which implements fire protection requirements. Procedure SO-G-103, Attachment 7.5, requires, in part, that all fire barriers protecting safety-related areas shall be functional. Engineering evaluations describe the barrier between Rooms 62 and 69 as a hinged metal plate cover with angle irons providing an

overlap that prevents any opening or gaps for flame propagation. Contrary to the above, the licensee failed to ensure that all fire barriers protecting safety-related areas were functional. Specifically, between Rooms 62 and 69, gaps and openings existed in a barrier (a hinged metal plate) due to missing angle irons that would have allowed flame propagation. This violation of Technical Specification 5.8.1 is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2004003-02). This violation is in the licensee's corrective action program as Condition Report 200401063.

(2) Cable Separation in Cable Vaults

Introduction. A Green, noncited violation of 10 CFR Part 50, Appendix R, was identified as a result of the failure to provide fire protection features for structures, systems, and components important to achieve and maintain cold shutdown or having the capability of repairing these components within 72 hours. Specifically, the licensee did not provide proper cable separation nor the necessary fire protection features for the raw water pump cabling in Manhole 5. In addition, the licensee did not have a procedure and materials available to repair the cabling within 72 hours.

Description. The raw water pumps are safety-related pumps located in the intake structure and are required for the plant to achieve and maintain cold shutdown conditions. The pumps receive power from the auxiliary building via underground cables. These cables pass through two cable vaults identified as Manholes 5 and 31. In Manhole 31 the cables pass through the cable vault in individual conduits as they enter the intake structure. In Manhole 5 the cables are in trays located on a nonrated concrete wall that separates the two trains of pumps. The inspectors questioned the licensee on the availability of repair procedures and materials if a fire were to occur in Manhole 5. The licensee indicated repair procedures had not been developed and repair materials had not been designated.

Analysis. The inspectors evaluated the safety significance of the finding. This finding affected the mitigating systems cornerstone and was considered more than minor since it affected the cornerstone attribute of Protection Against External Factors. Based on Manual Chapter 0609, Appendix F, the finding was determined to be in the Cold Shutdown category since the raw water pumps are needed to achieve and maintain cold shutdown. The inspectors assigned a moderate degradation rating because the concrete partition separating the trains would provide some protection. The inspectors performed the Phase 1 qualitative screening check and characterized the finding as having very low safety significance (Green) since the finding only affected the ability to reach and maintain cold shutdown conditions.

Enforcement. Technical Specification 5.8.1, requires, in part, that the licensee implement and maintain all provisions of a fire protection program. The Fort Calhoun Station fire protection program commits to 10 CFR Part 50, Appendix R, Section III.G.1, which requires, in part, that fire protection features shall be provided for structures, systems, and components important to achieve and maintain cold shutdown or that the

licensee must have the capability of repairing these components within 72 hours. Contrary to above, the licensee did not have fire protection features for the raw water pump cabling in Manhole 5 (a system important to achieve and maintain cold shutdown) nor the capability to repair the cabling within 72 hours. The raw water pumps are required to achieve and maintain a cold shutdown condition. This violation of 10 CFR Part 50, Appendix R, Section III.G.1, is being treated as a noncited violation, consistent with the Section VI.A of the NRC Enforcement Policy (NCV 05000285/2004003-03). This violation is in the licensee's corrective action program as Condition Report 200400348.

(3) Blocking of Fire Hose Station FP-7G

Introduction. A Green, noncited violation of Technical Specification 5.8.1 was identified for the failure to implement compensatory measures when access to Fire Hose Station FP-7G was blocked by a safety barricade erected in front of the fire hose station. The licensee did not stage a hose of equivalent capacity to service the unprotected areas from an operable hose station.

Description. On January 8, 2004, the inspectors identified that access to Fire Hose Station FP-7G access was partially blocked when licensee personnel constructed a safety barricade in front of the hose station to support maintenance in one of the safety injection pump rooms. This station is used to fight fires in the safety injection pump rooms. The inspectors questioned the auxiliary building operator, a member of the fire brigade, on the usability of the hose station and was told that it could not be used. Further questioning by the inspectors revealed that no compensatory measures were in place while the hose station was blocked and inoperable.

Analysis. The inspectors evaluated the safety significance of the finding. This finding affected the mitigating systems cornerstone and was considered more than minor since it affected the cornerstone attribute of Protection Against External Factors. Based on Manual Chapter 0609, Appendix F, the finding was determined to be in the Fixed Fire Suppression category because it affected a manual fixed fire suppression station. The inspectors concluded that the degradation rating of the finding was high because the hose station was not usable. The finding was characterized under the significance determination process as having very low safety significance (Green) since it only affected the ability to reach and maintain cold shutdown conditions.

This finding had crosscutting aspects associated with human performance. Licensee personnel constructed a safety barricade, to support maintenance, in the front of a hose station and caused the station to be inoperable. This action directly contributed to the finding.

Enforcement. Technical Specification 5.8.1 requires, in part, that written procedures shall be established and maintained for implementation of the fire protection program. Procedure SO-G-102, "Fire Protection Program Plan," Revision 5, was the governing document for all fire protection program plan implementing procedures and references

Procedure SO-G-103, "Fire Protection Operability Criteria and Surveillance Requirements," Revision 16, which implements fire protection requirements. Procedure SO-G-103, Attachment 7.4, requires, in part, that a hose of equivalent capacity be staged to service the unprotected areas from an operable hose station. Contrary to the above, a hose from an operable hose station was not staged prior to erecting the safety rail that rendered Fire Hose Station FP-7G unusable. This violation of Technical Specification 5.8.1 is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2004003-04). This violation is in the licensee's corrective action program as Condition Report 200400187.

.2 Annual Fire Drill Observation

a. Inspection Scope

The inspectors observed fire drill training (one inspection sample) on June 18, 2004, and evaluated the readiness of licensee personnel to prevent and fight fires. The inspectors assessed proper donning of fire gear, use of a self-contained breathing apparatus, entry into the fire area, fire brigade leader's directions, simulated and actual use of firefighting equipment, and communications. The inspectors discussed any observations with the evaluator following the drill scenario.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

.1 Annual Review (71111.07A)

a. Inspection Scope

The inspectors reviewed Work Order 00156682-01, "AC-1A, Performance Monitoring Test for CCW HX," associated with the performance of CCW Heat Exchanger AC-1A (one inspection sample). The inspectors reviewed the test acceptance criteria and results to ensure differences between testing conditions and design conditions were considered. In addition, the inspectors reviewed the test results against pre-established engineered acceptance criteria.

b. Findings

No findings of significance were identified.

.2 Biennial Review - Inspection (71111.07B)

a. Inspection Scope

Biennial Review of Maintenance and Inspection Activities. During the week of May 10, 2004, the inspectors reviewed the licensee's testing, cleaning, and inspection methodology for the selected inspection samples. The purpose of this biennial review was to verify: (1) that testing, inspection/maintenance, or monitoring of biotic fouling controls were, singularly or in combination, adequate to ensure proper heat transfer; (2) methods used to inspect heat exchangers were consistent with expected degradation; (3) established acceptance criteria were consistent with accepted industry standards, or equivalent, including acceptability of the cleaning interval; (4) as-found results were appropriately dispositioned such that the final condition was acceptable; and (5) adequate performance of the ultimate heat sink and subcomponents. The inspectors reviewed design and vendor-supplied information to ensure that the heat exchangers were performing within their design bases. The inspectors also reviewed heat exchanger testing and inspection results. Additionally, the inspectors assessed the licensee's actions to trend inspection results, assess the causes of the trends, and implement actions to address problems identified.

Biennial Verification of Conditions and Operations Consistent with Design Bases. For the selected heat exchangers, the inspectors verified that the heat sink, heat exchanger condition and operation, and inspection and cleaning criteria were consistent with the design assumptions. Specifically, the inspectors reviewed the applicable calculations to ensure that the inspection and cleaning acceptance criteria for the heat exchangers were being applied consistently throughout the calculations. The inspectors also verified that the appropriate acceptance values for fouling and tube plugging for the selected heat exchangers remained consistent with the values used in the design-basis calculations. The purpose of this biennial review was to verify that:

- Test acceptance criteria and results appropriately considered differences between testing conditions and design conditions
- Inspection results were appropriately categorized against pre-established engineered acceptance criteria and were acceptable
- The frequency of testing or inspection was sufficient to detect degradation prior to loss of heat removal capabilities below design-basis values
- Test results considered test instrument inaccuracies and differences
- The licensee had developed acceptance criteria for its biofouling controls

Inspection Procedure 71111.07B requires selecting two to three risk-significant heat exchangers that are directly or indirectly connected to the safety-related service water

system. The inspectors reviewed the following three samples during this inspection: Shutdown Cooling Heat Exchanger AC-4B, Raw Water/CCW Heat Exchanger AC-1B, and Spent Fuel Pool Cooling Heat Exchanger AC-8.

b. Findings

Introduction. A Green, noncited violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for failure to follow a procedure for an activity affecting quality. The inspectors identified that the licensee had determined that Technical Specification 2.4 was inadequate to assure that the safety function of heat removal for the raw water and CCW systems would be assured, but had failed to perform a prompt assessment of operability and submit a Technical Specification change in a timely manner.

Description. In 1996, engineering personnel identified that certain river conditions (level and/or temperature) in combination with equipment outages permitted by Technical Specification action statements would not support required heat removal under certain design basis accidents. The specific limitations were presented graphically in Technical Data Book Table III.41.

Condition Report 200300896, written on March 14, 2003, stated that Table III.41 appeared to indicate that Technical Specifications 2.4 and 2.16 were inadequate and should be improved. It further stated that it was unclear how the table related to Technical Specifications and whether it constituted administrative controls that compensate for an inadequate Technical Specification. This condition report appropriately made reference to NRC Administrative Letter 98-10, for dispositioning Technical Specifications that were insufficient to assure plant safety, and to Generic Letter 91-18 for assessing operability issues. However, this NRC guidance was not followed. Specifically, the licensee did not perform an assessment of whether the affected systems were capable of performing their intended functions and whether the administrative controls were adequate to compensate for the degraded condition. Administrative Letter 98-10 defined inadequate Technical Specifications as a degraded or nonconforming condition, which Generic Letter 91-18 indicated should be promptly evaluated for these capabilities. Additionally, the licensee did not promptly submit a change to their Technical Specifications to correct the problem. The inspectors determined that, at the time of the inspection, the licensee did not have a near-term plan for submitting a proposed Technical Specification change. Administrative Letter 98-10 discussed the need for timely corrective actions per Generic Letter 91-18 and noted an example of waiting a year to submit a Technical Specification change as untimely action.

A similar issue was also identified during this inspection. In 1996, during the same engineering evaluation that led to the creation of Table III.41, engineering personnel had identified that, when river temperature was above 70ºF, a single failure of a raw water isolation valve associated with a raw water/CCW heat exchanger could prevent adequate heat removal. The licensee appropriately identified that NRC review was required and implemented administrative measures to prevent the single failure of concern, but did not change the Technical Specification appropriately. Since the issue

was submitted to the NRC for review as a change to the Technical Specification Bases, it was not a violation like the example above, although the Technical Specification still needed to be promptly corrected; this was entered into the licensee's corrective action program under Condition Report 200401761. However, the inspectors were concerned that the two issues had evolved from the same large engineering review. To address this concern, the licensee referenced Condition Report 200401754, which performs additional analysis to further determine the operability limits of the raw water and CCW systems.

Analysis. This finding was more than minor because, if left uncorrected, this condition could result in a loss of the heat removal function under certain conditions permitted by the current Technical Specifications. The finding affected the mitigating systems cornerstone. The finding was determined to have very low safety significance in a Phase 1 screening because this issue represented a design deficiency that had not resulted in a known loss of function per Generic Letter 91-18.

Enforcement. 10 CFR Part 50, Appendix B, Criterion V, requires, in part, 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, or drawings. Procedure NOD-QP-31, "Operability Determinations and Safety Analysis for Operability (SAO)," Revision 23, implemented this requirement as it related to addressing questions that potentially affected the operability of safety-related structures, systems, and components. Procedure NOD-QP-3, section 6.3.7, requires, in part, that, if restrictions more limiting than those described in Technical Specifications are required to maintain a structures, systems, or components in an operable status, an operability evaluation must be completed and a safety analysis for operability must be completed to assure that the restrictions are adequately documented and evaluated as required by 10 CFR 50.59.

Contrary to the above, from March 13, 2003, until May 14, 2004, the licensee failed to perform an operability evaluation or a safety analysis for operability when additional restrictions on raw water and CCW system operability were questioned. The licensee failed to perform a safety analysis for operability for the degraded condition of having inadequate Technical Specifications to ensure that heat removal functions of the CCW and raw water systems were assured as required. If this procedure had been correctly followed, the licensee should have recognized that a timely Technical Specification change was required. A safety assessment of operability was completed and approved by the plant review committee on May 21, 2004. This violation of 10 CFR Part 50, Appendix B, Criterion V, is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2004003-05). This violation is in the licensee's corrective action program as Condition Reports 200401754 and 200401761.

.3 Biennial Review - Identification and Resolution of Problems (71111.07B)

a. Inspection Scope

The inspectors verified that the licensee had entered significant heat exchanger/heat sink performance problems into the corrective action program. The inspectors reviewed issues associated with the potential to degrade heat exchanger performance, including issues relating to silting, corrosion, fouling, and heat exchanger testing in order to verify that licensee corrective actions were appropriate in accordance with Inspection Procedure 71152. Specific condition reports reviewed are listed in the attachment.

b. Findings

Introduction. A Green finding was identified for failure to determine the extent of condition and correct the causal factors for heat exchanger tube pitting in the CCW system.

Description. Raw Water/CCW Heat Exchangers AC-1A and AC-1B tubes had experienced pitting corrosion on the CCW side since at least 1996. The licensee had tentatively attributed the cause of pitting observed in 1996 to be microbiologically induced corrosion (MIC) at that time and in subsequent recurrences. The licensee was not timely in positively identifying the cause, had not determined whether this problem existed in other components in the same system, and had not taken actions to arrest continued pitting.

The CCW system consists of Raw Water/CCW Heat Exchangers AC-1A, -1B, -1C, and -1D that reject heat from the CCW system to the raw water system. The system removes heat from the following loads:

- Two shutdown cooling heat exchangers
- Two control room air conditioning units
- One letdown heat exchanger
- One spent fuel pool heat exchanger
- Four containment cooling units
- Various small coolers associated with reactor coolant pumps, safety injection and containment spray pumps, charging pumps and other loads.

The inspectors noted that only Raw Water/CCW Heat Exchangers AC-1A and AC-1B of the four monitored heat exchangers had experienced pitting-type corrosion. The licensee had plugged 32 and 33 tubes in these heat exchangers, respectively, mostly due to pitting. The licensee had not attempted to explain why pitting occurred in only

two of the four identical heat exchangers. The licensee had been successfully inspecting the heat exchangers and plugging tubes prior to experiencing through-wall leaks. However, Condition Report 199600281 contained a root cause and generic implications report for tube pitting observed in Raw Water/CCW Heat Exchanger AC-1B. One tube had been pulled, cleaned, and sent to a lab for examination and analysis. The licensee report had concluded: "Based on pit morphology and a high concentration of carbon and silicon in the deposits, it appears that microbiologically induced corrosion was the most likely cause of the pitting damage." The report indicated that, in order for MIC to be considered the cause for active corrosion attack, four factors must be present:

- Presence of microorganisms or their byproducts
- Microbiologically unique corrosion morphologies
- Specific corrosion products and deposits
- Compatible environmental conditions

The report went on to note that the latter three conditions were confirmed, but that, in order to positively confirm that MIC caused the observed pitting, a more extensive investigation was required. This was stated to involve analyzing the surface films and slime on the heat exchanger for evidence of bacteria. The report noted that a sample of slime found on the tube when it was removed could not be analyzed because it contained small amounts of radioactive contamination and could not be free-released. This appeared to be a missed opportunity to assess the biological environment. As a consequence, the 1996 root cause assessment remained incomplete.

Since 1996, the licensee had not obtained any samples to support or refute the presence of microorganisms or their byproducts relating to microbiologically induced corrosion. Attempts during the 2002 and 2003 refueling outages to pull additional tubes and obtain biological samples failed because the licensee was unsuccessful in setting the necessary plant conditions. As a result, corrective actions were limited to a general improvement of the chemistry control program for the CCW system. Based on subsequent tube inspection reports, this has not arrested pitting in Raw Water/CCW Heat Exchangers AC-1A or AC-1B.

NRC Information Notice 85-30 discussed MIC problems. The inspectors noted that the licensee's analysis of this Information Notice stated that the CCW system would not be susceptible to MIC because water chemistry was maintained with chromates, which was toxic to bacteria. However, in 1989, the licensee switched to nitrate chemistry in the CCW system without evaluating the change on creating a new potential for MIC. The cognizant Fort Calhoun Station chemist stated that nitrates are not toxic to bacteria and form a food for them.

The inspectors determined that the licensee was relying on the chemistry controls for the CCW system as a basis for not testing, inspecting, or cleaning most of the heat exchangers in the CCW system. The raw water/CCW heat exchangers were monitored with the intent that unexplained fouling of these would be used to determine whether

actions were needed in other heat exchangers that were part of the CCW system. However, the analysis to support this policy did not address the pitting which potentially challenged the pressure barrier function that was present and ongoing in the monitored heat exchangers; this pitting had not triggered similar inspections in the other heat exchangers, even though they shared the same chemical environment.

Based on the ongoing nature of the pitting observed in Raw Water/CCW Heat Exchangers AC-1A and AC-1B, the inspectors concluded that the chemistry sampling and control methodology was not effective to control or eliminate the cause of the pitting. A June 2003 external self-assessment (Condition Report 200303484) concluded that the licensee was complying with Electric Power Research Institute chemistry control guidelines for the CCW system, but went on to list weaknesses in controlling oxygen in the CCW system and allowing biological slime, corrosion products, and silt to accumulate in low flow areas, such as the shutdown cooling heat exchangers. These were conditions which could help promote MIC. The report strongly recommended that additional testing be completed to determine the cause of the pitting in Raw Water/CCW Heat Exchangers AC-1A and AC-1B.

The inspectors also determined that the licensee's weekly sampling for evidence of biological activity in the CCW system did not effectively sample the conditions present in idle heat exchangers; for example, the shutdown cooling heat exchangers had very limited flow when the plant was at power. During outages in 2002 and 2003, chemistry samples of the CCW system indicated large increases in biological activity which were attributed to placing shutdown cooling heat exchangers in service, as documented in Condition Reports 200202989 and 200304600. This indicated that microorganisms and/or their byproducts were present in these heat exchangers but had not been detected during weekly sampling prior to the outage. Information Notice 85-30 stated that low flow rates or stagnant conditions favored attachment of organisms, biofouling, and concentration cell corrosion and recommended the performance of periodic flushing. The licensee performed biocide treatment of the CCW system only in response to sampling results. During the inspection, Condition Report 200401758 was written to address improvements in equipment rotation and periodic flushing.

The inspectors concluded that the licensee had failed to determine the extent of the pitting corrosion in components of the CCW system beyond the raw water/CCW heat exchangers in a timely manner. Heat exchanger inspections were not performed for loads cooled by CCW and samples were not obtained to support or refute the presumed pitting attack mechanism. Of particular concern, Shutdown Cooling Heat Exchangers AC-4A and AC-4B had material and environmental susceptibilities to MIC and had not been inspected in over 20 years to determine the condition of the tubes.

Analysis. This finding was more than minor because, if left uncorrected, the pitting being observed could become a through-wall leak, which would be a more significant safety concern. Also, pitting could be present in other heat exchanger tubes in the CCW system, which had not been inspected. The finding affected the mitigating

systems cornerstone. The finding was determined to have very low safety significance in a Phase 1 screening because this issue represented a deficiency that had not resulted in a loss of function.

Enforcement. This finding was reviewed against the requirements of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions." The inspectors concluded that, at the time of the inspection, there was not sufficient evidence that a violation had occurred. This was primarily due to a lack of inspection results for the majority of the CCW system. Since the issue related to the licensee's failure to obtain this information, documenting the issue as a finding was determined to be appropriate. This finding (FIN 05000285/2004003-06) was entered into the licensee's corrective action program as Condition Report 200401758.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

The inspectors performed licensed operator requalification observation (one inspection sample). On June 7, 2004, the inspectors observed licensed operator requalification training activities, including the licensed operators' performance and the evaluators' critique. The inspectors compared performance in the simulator with performance observed in the control room during this inspection period. The focus of the inspection was on high-risk licensed operator actions, operator activities associated with the emergency plan, and previous lessons-learned items. These items were evaluated to ensure that operator performance was consistent with protection of the reactor core during postulated accidents.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the requirements of the Maintenance Rule (10 CFR 50.65) and verified that the licensee conducted appropriate evaluations of equipment functional failures, maintenance preventable functional failures, the unplanned capacity loss factor, and system unavailability. The inspectors discussed the evaluations with the licensee personnel. The following maintenance rule items were reviewed (two inspection samples):

- House Service Power Transformer T1A-3 (Condition Reports 200401486, 200401489, 200401490, and 200401507)

- Raw Water Strainer AC-12A (Condition Report 200400454)

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed risk assessments by the licensee for equipment outages (five inspection samples) as a result of planned and emergent maintenance to evaluate the licensee's effectiveness in assessing risk for these activities. The inspectors compared the licensee's risk assessment and risk management activities against requirements of 10 CFR 50.65 (a)(4). The inspectors discussed the planned and emergent work activities with planning and maintenance personnel. The inspectors verified that plant personnel were aware of the appropriate licensee-established risk category, according to the risk assessment results and licensee program procedures. The inspectors reviewed the effectiveness of risk assessment and risk management for the following activities:

- Outage of House Service Power Transformer T1A-3 on April 19, 2004
- Outage of Raw Water Pump AC-10A, Air Compressor CA-1A, Circulating Water Pump CW-1C, Bearing Water Cooler CW-6B, Main Feedwater Pump FW-4B, and Containment Air Cooling Unit VA-7C on May 4, 2004
- Outage of Main Feed Water Pump FW-4C, CCW Pump AC-3B, CCW Heat Exchanger AC-1B, Charging Pump CH-1C, and Raw Water Pump AC-10B on May 25, 2004
- Outage of CCW Pump AC-3A and High Pressure Safety Injection Pump SI-3C on June 7, 2004
- Outage of Diesel Generator 1 and High Pressure Safety Injection Pump SI-3A on June 9, 2004

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Nonroutine Evolutions and Events (71111.14)

a. Inspection Scope

On March 25, 2004, operators entered Technical Specification 2.0.1 as a result of both Control Room Air Conditioning Units VA-46A and VA-46B being inoperable. Operators subsequently restarted one of the units before a required plant power reduction was

initiated. Following the event, the inspectors performed a walkdown of the control room air conditioning units to verify proper operation. The inspectors discussed the event with the control room staff and licensee management. The inspectors reviewed Condition Report 200401148 and the causal assessment of the event.

b. Findings

Introduction. A Green, noncited violation of Technical Specification 5.8.1 was identified as a result of maintenance personnel failing to follow documented instructions. These actions caused a control room air conditioning unit to become inoperable while the other unit was already removed from service.

Description. On March 25, 2004, maintenance personnel received authorization from operators to perform similar preventive maintenance activities on both control room air conditioning units. Operators removed Control Room Air Conditioning Unit VA-46A from service to allow maintenance personnel to perform the work activities. Maintenance personnel performed the activity and then began working on Control Room Air Conditioning Unit VA-46B with the unit in service. The maintenance personnel reached a point in the instruction that required operators to shut down and tag out Control Room Air Conditioning Unit VA-46B. Tagging out Unit VA-46B would have caused both control room air conditioning units to be inoperable and was against standard operator practice. Instead of following the instruction, maintenance personnel initiated a methodology that had been used in the past to obtain the compressor motor winding resistance. The methodology included increasing the temperature setpoint on the discharge air controller to cause the compressor to cycle off. Maintenance personnel would then obtain the compressor motor winding resistance. Instead of increasing the setpoint on the discharge air controller, maintenance personnel decreased the setpoint and, when leads were lifted to obtain the resistance readings, the unit tripped.

When Control Room Air Conditioning Unit VA-46B tripped, operators entered Technical Specification 2.0.1 as a result of both control room air conditioning units being inoperable. Operators removed the tags from Control Room Air Conditioning Unit VA-46A and started the unit. The total time that both units were unavailable to cool the control room was approximately 10 minutes.

Analysis. The inspectors evaluated the safety significance of the issue. This finding was associated with the mitigating systems cornerstone and affected the equipment performance attribute. The finding was considered more than minor because a loss of the control room air conditioning equipment will result in an increase in control room temperature and affect the performance of safety-related equipment in the control room. The finding was determined to have very low safety significance in a Phase 1 screening because the operators restarted the control room air conditioning equipment within approximately 10 minutes of the loss of control room cooling; therefore, the control room did not heat up significantly and all control room equipment remained operable.

This finding had crosscutting aspects associated with human performance. The failure by maintenance personnel to follow documented instructions directly contributed to the finding.

Enforcement. Technical Specification 5.8.1 requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures in Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, Revision 2, Appendix A, step 9.a, requires, in part, that maintenance that can affect the performance of safety-related equipment be performed in accordance with documented instructions. Work Order 00163440-01 provides documented instructions for the maintenance on Control Room Air Conditioning Unit VA-46B (safety-related equipment). Contrary to the above, on March 25, 2004, maintenance personnel failed to follow documented instructions and caused a control room air conditioning unit trip while the other unit was already removed from service. This violation of Technical Specification 5.8.1 is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2004003-07). This violation is in the licensee's corrective action program as Condition Report 200401148.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed operability evaluations (four inspection samples) to verify that the evaluations provided adequate justification that the affected equipment could still meet its Technical Specification, Updated Safety Analysis Report, and design bases requirements. The inspectors also discussed the evaluations with cognizant licensee personnel. The inspectors reviewed the operability evaluations and cause assessments for the following:

- Containment Spray Valve HCV-344 opening to 91 percent instead of 100 percent (Condition Report 200401315)
- Effects of a loose part on the lower portion of the reactor vessel (Condition Report 200401402)
- Effects of storing temporary lead shielding blankets in steel drums located near the containment sumps (Condition Report 200402394)
- Elevated seal leakage on Raw Water Pump AC-10D (Condition Report 200402157)

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

The inspectors performed a selected review (one inspection sample) of an operator workaround created by leakage past the Blending Tee CH-13 Demineralized Water Inlet Valve FCV-269X. The inspectors discussed the impact of the operator workaround on the operator's ability to implement abnormal or emergency operating procedures. The inspectors discussed the planned corrective actions for the deficiency with operations supervision.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Tests (71111.19)

a. Inspection Scope

The inspectors observed and/or reviewed postmaintenance tests (six inspection samples) to verify that the test procedures adequately demonstrated system operability. The inspectors also verified that the tests were adequate for the scope of the maintenance work performed and that the acceptance criteria were clear and consistent with design and licensing basis documents. The following activities were included in the scope of this inspection:

- Work Order 00171633-01, troubleshoot why Containment Spray Header Isolation Valve HCV-344 stroked 75 percent open
- Work Order 00171693-01, troubleshoot Safety Injection Cooler SI-4D Outlet Pressure Control Valve PCV-2969 position indication
- Work Order 00163634-01, drain the antifreeze from Diesel Generator 1 and replace it with demineralized water and corrosion inhibitor
- Work Order 00174159-01, rebuild the actuator for the Outlet to Containment Air Cooling Unit VA-8A Valve HCV-402D
- Work Order 00108854, modify electrical connections associated with Charging Pump CH-1B packing cooling pump, packing cooling pump low discharge pressure alarm, and seal water makeup level control switch
- Work Order 00179457-01, troubleshoot Charging Pump CH-1B Breaker 1B4C-6

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

On March 26, 2004, the licensee entered a planned outage to replace reactor coolant pump seal packages. The inspectors reviewed the licensee's outage shutdown risk assessment to verify that the licensee appropriately considered risk in planning and scheduling the outage activities. The inspectors observed shutdown maintenance activities, midloop operations, filling of the reactor coolant system, and plant heatup. The inspectors verified that the activities were performed in accordance with approved procedures and Technical Specification requirements. Periodically, the inspectors evaluated plant conditions to verify that safety systems were properly aligned and that maintenance activities were controlled in accordance with the outage risk control plan. The inspectors also performed containment tours and verified containment cleanliness prior to plant heatup.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed and/or reviewed the performance and documentation for the following surveillance tests (five inspection samples) to verify that the structures, systems, and components were capable of performing their intended safety functions and to assess operational readiness:

- Procedure OP-ST-ESF-0010, "Channel B Safety Injection, Containment Spray and Recirculation Actuation Signal Test," Revision 41
- Procedure IC-ST-IA-3007, "Instrument Air Accumulator Check Valve Operability Test, Control Room Filter System," Revision 6
- Procedure OP-ST-WDL-3001, "Waste Disposal System Category A and B Valve Exercise Test," Revision 13
- Procedure OP-ST-CEA-0004, "Secondary CEA Position Indication System Test," Revision 15

- Procedure OP-ST-RW-3001, “AC-10A Raw Water Pump Quarterly Inservice Test,” Revision 29

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed Temporary Modification EC 33602, Revision 1 (one inspection sample), that installed a compensating resistor in place of the compensating leg of Resistance Temperature Device B/TE-112H that is connected to the quality safety parameter display system. In addition, the inspectors reviewed the associated 10 CFR 50.59 screening and the postinstallation test results to confirm that the test was satisfactory and that the modification had no adverse impact on the permanent system.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Observation (71114.06)

a. Inspection Scope

On June 29, 2004, the inspectors observed an emergency preparedness drill from the simulator (one inspection sample). The purpose of the observations was to evaluate operator performance, licensee event classification, notification of state and local authorities, and the adequacy of protective action recommendations. The inspectors attended the licensee’s postdrill critiques and discussed observations with licensee management.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by Technical Specification 5.8.1 as criteria for determining compliance. The inspectors completed 12 of the required 29 samples. The inspectors interviewed licensee personnel and reviewed:

- Current 3-year rolling average collective exposure
- Site-specific trends in collective exposures, plant historical data, and source-term measurements
- Site specific ALARA procedures
- Three work activities of highest exposure significance completed during the last outage
- Person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements
- Shielding requests and dose/benefit analyses
- Dose rate reduction activities in work planning
- First-line job supervisors' contribution to ensuring work activities are conducted in a dose efficient manner
- Exposures of individuals from selected work groups
- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Resolution through the corrective action process of problems identified through postjob reviews and postoutage ALARA report critiques

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed the licensee's performance indicator data to verify its accuracy and completeness for the following two indicators:

- MS2 High Pressure Injection System Unavailability
- MS4 Heat Removal System Unavailability

The inspectors reviewed the performance indicator data for the last 3 quarters of 2003 and the first quarter of 2004. The inspectors reviewed NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee operating logs. The inspectors discussed the status of the performance indicators and compilation of data with licensee personnel. The inspectors reviewed Condition Reports 200402114 and 200402257.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Selected Issue Followup Inspection

a. Inspection Scope

The CCW inlet and outlet valves to the containment air cooling units are air-operated butterfly valves that fail as-is on a loss of air. The inspectors questioned engineering personnel about how the valves respond to flow-induced hydrodynamic torque. The licensee initiated Condition Report 200401672 to address the inspectors' question. The inspectors reviewed the condition report to evaluate the licensee's disposition of valve and component operability and resolution of the flow-induced hydrodynamic torque question. In addition, the inspectors reviewed Condition Reports 200400008, 200401628, 200401785, and 200401815.

b. Findings

Introduction. A Green, noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, was identified as a result of the licensee's failure to establish a test program to demonstrate that the backup nitrogen supply systems to the CCW inlet and outlet valves to the containment air cooling units will perform satisfactorily. The licensee only

performed leak rate testing of the backup nitrogen supply systems with the CCW inlet and outlet valves in the closed position and did not leak test the backup nitrogen supply systems with the inlet and outlet valves in the open accident position.

Description. Flow-induced hydrodynamic torque is a phenomenon in which water flow on the outside pipe bend, being of higher velocity, could have a net affect of causing an induced torque on a butterfly valve disc. This torque would tend to cause the valve to either open or close depending upon the valve orientation and valve proximity to the upstream bend.

The CCW inlet and outlet valves to the containment air cooling units are air-operated butterfly valves that fail as-is on a loss of air. The inspectors questioned engineering about how the valves respond to flow-induced hydrodynamic torque. The licensee initiated Condition Report 200401672 to address the inspectors' question.
On May 7, 2004, engineering completed an operability evaluation to document justification for operability of the CCW inlet and outlet valves to the containment air cooling units. The inspectors found that the operability evaluation was incomplete. The evaluation indicated that the nitrogen backup function of the valves was verified by Procedure IC-PM-CCW-0350, "Backup Nitrogen Supply Systems," Revision 3. The inspectors identified that Procedure IC-PM-CCW-0350 only performed leak rate testing of the backup nitrogen supply systems with the valves in the closed position and did not leak test the backup nitrogen supply systems with the valves in the open accident position. In addition, the evaluation indicated that the valves would tend to stay open due to the centric placement of the shaft with respect to the butterfly disc. The inspectors noted that the licensee still did not account for the potential of flow-induced hydrodynamic torque to close the valves.

On May 12 engineering completed another operability evaluation and determined that, of the 16 CCW inlet and outlet valves, 8 valves were subject to flow-induced hydrodynamic torque. Flow-induced hydrodynamic torque would tend to close 4 of the valves and open 4 of the valves. Of the 8 unaffected valves, 4 of the valves were evaluated not to be affected by hydrodynamic torque due to the interior design of the valves, and 4 were evaluated not to be affected due to straight runs of pipe greater than 8 diameters of length prior to the valve. The inspectors performed a walkdown of the CCW inlet and outlet valves and noted that 2 of the valves were closer than 8 pipe diameters from the pipe bend and could be affected by hydrodynamic torque. The licensee agreed with the inspectors' observations and revised the operability evaluation.

On May 14 engineering completed a third operability evaluation. On May 19 this evaluation was approved by the plant review committee. The evaluation documented that the containment cooling units were operable based on the small leakage rates of the backup nitrogen supply system and the availability of at least a 6-hour period for operator action to replace the nitrogen bottles. The inspectors agreed with the licensee's operability assessment.

The licensee performed leak rate testing of the backup nitrogen supply systems with the CCW inlet and outlet valves in the open position. The licensee identified that Containment Cooling Inlet Valve HCV-403A failed the drop test acceptance criteria of 27 pounds of nitrogen in an hour. The valve lost 34 pounds of nitrogen in an hour. The inspectors noted that the nitrogen supply bottles normally have greater than 1000 pounds of pressure in the bottle; therefore, a significant time was available for the licensee to swap nitrogen bottles should the pressure get low. In addition, this valve would tend to fail open due to hydrodynamic torque.

The licensee performed a risk assessment that included the as-found condition of the inlet and outlet valves and concluded that the core damage frequency and large early release frequency remained unchanged. The licensee does not credit the containment coolers for pressure control during a loss-of-coolant accident and only credits one containment cooler in the containment pressure analysis for a main steam line break.

Analysis. The inspectors evaluated the safety significance of the issue. This finding affected the barrier integrity cornerstone and was considered more than minor since it was associated with the containment configuration control attribute. The finding was assessed using the significance determination process for containment integrity, Manual Chapter 0609, Appendix H. The finding was determined to have no impact on core damage frequency or large early release frequency. Therefore, the finding screened as Green based on Appendix H, Table 4.1.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that components will perform satisfactorily in service is identified and performed in accordance with written procedures. Procedure IC-PM-CCW-0350, "Backup Nitrogen Supply Systems," Revision 3, provided instructions for functional testing of the backup nitrogen supply systems to the CCW inlet and outlet valves to the containment air cooling coils. Contrary to the above, the licensee failed to establish a test program to demonstrate that the backup nitrogen supply systems to the CCW inlet and outlet valves to the containment air cooling coils will perform satisfactorily. The licensee only performed leak rate testing of the backup nitrogen supply systems with the CCW inlet and outlet valves in the closed position and did not leak test the backup nitrogen supply systems with the inlet and outlet valves in the open accident position. This violation of 10 CFR Part 50, Appendix B, Criterion XI, is being treated as an NCV, consistent with the Section VI.A of the Enforcement Policy (NCV 05000285/ 2004003-08). This violation is in the licensee's corrective action program as Condition Report 200401642.

.2 Semiannual Review

a. Inspection Scope

The inspectors performed a semiannual review to identify trends that might indicate the existence of more significant safety issues in the 480 volt distribution system.

Inspectors reviewed corrective action reports, maintenance work orders, system health reports, temporary modifications, and control room logs.

b. Findings and Observations

No findings of significance were identified. The inspectors noted that the licensee has evaluated the electrical system to identify the obsolete components, components subject to aging, and components with a qualified life and planned to develop programs to address these issues.

.3 ALARA Planning and Controls

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's problem identification and resolution processes regarding exposure tracking, higher than planned exposure levels, and radiation worker practices.

b. Findings

No findings of significance were identified.

4OA4 Crosscutting Aspects of Findings

Section 1R05.1b3 describes the actions performed by licensee personnel to construct a safety barricade, to support maintenance, in the front of a hose station, causing the station to be inoperable. This finding had crosscutting aspects associated with human performance.

Section 1R07.3 describes that the licensee was untimely in its actions to determine the extent of condition and causal factors associated with pitting in CCW heat exchanger tubes. This finding had crosscutting aspects associated with problem identification and resolution.

Section 1R14 describes maintenance personnel failing to follow documented instructions. These actions caused the tripping of a control room air conditioning unit while the other unit was already removed from service. This finding had crosscutting aspects associated with human performance.

4OA5 Other

.1 Temporary Instruction 2515/156: Offsite Power System Operational Readiness

a. Scope

The inspectors collected data from licensee maintenance records, event reports, corrective action documents, procedures, and interviews. The data was gathered to assess the operational readiness of the offsite power systems in accordance with the following requirements: 10 CFR Part 50, Appendix A, General Design Criterion 17; 10 CFR Part 50, Appendix B, Criterion XVI; Plant Technical Specifications; 10 CFR 50.63; 10 CFR 50.65(a)(4); and licensee procedures. Specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified. In accordance with Temporary Instruction 2515/156 reporting requirements, the inspectors provided the required data to the headquarters staff for further analysis.

4OA6 Meetings

Exit Meeting Summary

The results of the ALARA planning and controls inspection were presented to Mr. M. Frans, Assistant Plant Manager, and other members of licensee management on May 20, 2004. The licensee's management acknowledged the inspection findings and stated that none of the material examined during the inspection was considered proprietary.

The results of the heat sink performance inspection were presented to Mr. D. Bannister, Plant Manager, and other members of licensee management on May 14, 2004. The licensee's management acknowledged the inspection findings and stated that none of the material examined during the inspection was considered proprietary. A subsequent re-exit was conducted telephonically with Mr. R. Phelps, Division Manager, Nuclear Engineering, and other members of licensee management on May 20, 2004.

The results of the resident inspectors' activities were presented to Mr. R. Phelps, Division Manager, Nuclear Engineering, and other members of licensee management on July 7, 2004. The licensee's management acknowledged the inspection findings and stated that some of the material examined during the inspection was considered proprietary. The inspectors indicated that, although examined, no proprietary information was documented in the inspection report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Bannister, Plant Manager
A. Clark, Manager, Security and Emergency Planning
R. Clemens, Division Manager, Nuclear Assessments
M. Core, Manager, System Engineering
M. Frans, Assistant Plant Manager
R. Haug, Manager, Chemistry
J. Herman, Manager, Nuclear Licensing
J. McManis, Manager, Design Engineering
R. Phelps, Division Manager, Nuclear Engineering
M. Puckett, Manager, Radiation Protection

NRC Personnel

S. Dembek, Chief, PD IV-2

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000285/2004003-01	NCV	Inadequate Abnormal Operating Procedure for High Winds Onsite (Section 1R01)
05000285/2004003-02	NCV	Failing to Ensure that Fire Barriers Protecting Safety-Related Areas Were Functional (Section 1R05.1b1)
05000285/2004003-03	NCV	Failure to Provide Fire Protection Features for Components Important to Achieve and Maintain Cold Shutdown (Section 1R05.1b2)
05000285/2004003-04	NCV	Failure to Provide Compensatory Measures When Blocking a Fire Hose Station (Section 1R05.1b3)
05000285/2004003-05	NCV	Failure to Follow Procedures to Address an Inadequate Technical Specification (Section 1R07.2)
05000285/2004003-06	FIN	Failure to Determine the Extent of Pitting in CCW Components and Correct the Causal Factors (Section 1R07.3)

05000285/2004003-07	NCV	Maintenance Personnel Failed to Follow Documented Instructions (Section 1R14)
05000285/2004003-08	NCV	Failure to Establish an Adequate Test Program for the Backup Nitrogen Supply Systems to the CCW Inlet and Outlet Valves to the Containment Air Cooling Units (Section 4OA2.1)

LIST OF DOCUMENTS REVIEWED

Section 2OS2: ALARA Planning and Controls (71121.02)

Procedures

RP-AD-300	ALARA Program, Revision 11
RP-204	Radiological Area Controls, Revision 36
RP-301	ALARA Job Reviews, Revision 21
RP-303	ALARA Cost-Benefit Analysis, Revision 4
RP-305	ALARA Suggestion Program, Revision 4
RP-306	Hot Spot and Point Source Identification and Tracking Procedure, Revision 13
RP-307	Use and Control of Temporary Shielding, Revision 10

Condition Reports

200305428, 200305605, 200305664, 200400037, 200400624, 200400852, 200400879

Audits and Self-Assessments and Reports

04-QUA-006, “Rad Waste Control”
2003 ALARA Report to the President
Dose Reduction Plan 2004-2009

Shielding Requests

LB-1
TSR-01-38
TSR-01-50
TSR-02-36
TSR-02-63
TSR-04-08

Radiation Work Permits

04-3009	Disassembly, decon, and tasks associated with reactor coolant pump seals
04-3502	Containment entry surveys and inspections
04-3503	Replace reactor coolant pump seals

ALARA Committee Minutes for 2004

January 9, 14, and 19
February 6, 12, and 26
March 3, 11, 22, and 25
April 27
May 11

Sections 1R07.2 and 1R07.3 Heat Sink Performance Biennial Review (71111.07B)

Engineering Assessments and Calculations

Engineering Assistance Requests 27057, 95-066, and 96-032

EA-FC-92-027, Component Cooling Water and Raw Water Post-Accident Single Failure Evaluation, Revision 3

Procedures

NOD-PP-N-3, Strategic Water Plan, Revision 1

NOD-QP-31, Operability Determinations and Safety Analysis for Operability, Revisions 23 and 24

OI-RW-1, Raw Water System Normal Operation, Revision 64

PED-SEI-16, Evaluation of Heat Exchanger Performance, Revision 6

SE-PFT-CCW-0001, Component Cooling Water Heat Exchangers Performance Test, Revision 11

SE-PFT-CCW-0004, SFP Heat Exchanger and Circulating Pump Performance Test, Revision 3

SE-PFT-CCW-0012, AC-4B Shutdown Cooling Heat Exchanger Performance Test, Revision 4

CH-AD-0003, Chemistry Administrative Procedure, Revision 53

CH-AD-0035, Microbiologically Induced/Influenced Corrosion Monitoring Program, Revision 1

CH-AD-0048, Chemistry Administrative Procedure, Revision 0

SDBD-AC-CCW-100, Component Cooling Water, Revision 29

SDBD-SI-130, Shutdown Cooling, Revision 13

SDBD-AC-SFO-102, Spent Fuel Storage and Fuel Pool Component, Revision 12

Heat Exchanger Test and Inspection Results

Root Cause and Generic Implications Report AC-1B CCW Heat Exchanger Tube Failure Analysis, Revision 0 (Condition Report 199600281)

Inservice Eddy Current Examination Report for Shutdown Cooling Heat Exchanger, by Conam Inspection dated February 22, 1983

Record of Eddy Current Inspection of Component Cooler AC-1B by Integrated Technologies, Inc, January 27, 2002

Performance Monitoring Tests Work Orders: 00152813, 00113517, 00107103, 00107195, 00121854, 00150880, 0054235, 9603511, 9603493, 9305889, 9201881

Heat Exchanger Inspections Work Orders: 00139297 and 00206837

Calculation FC06651, RW Heat Exchanger Temperature Loop Uncertainty, Revision 0

Condition Reports

199700866, 200103737, 200200103, 200200515, 200202989, 200300896, 200303484, 200304600, 200304648, 200304650, 200401754, 200401758, 200401761, 200401768, 200401831, 200401832

Miscellaneous Documents:

Fort Calhoun Station Updated Safety Analysis Report

OPPD Letter Serial Lic-90-0050, “Response to Generic Letter 89-13," dated January 26, 1990

OPPD Letter Serial Lic-92-330, “Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment - Confirmation of Completion of Recommended Actions," dated November 16, 1992

OPPD Memorandum EOS-SYE-98-062, “Performance Monitoring of Heat Exchangers in Response to Generic Letter 89-13,” dated March 31, 1998

Memorandum TS-FC-85-256H, Response to LAD 850173, IEN 85-30, Microbiologically Induced Corrosion of Containment Service Water, dated June 11, 1985

Section 4OA5 Offsite Power System Operational Readiness (TI 2515/156)

Procedure AOP-31, “161 Kv Grid Malfunctions,” Revision 5

Procedure OI-EG-3, “PCMMINT Post-FCS-Trip 161Kv Voltage Prediction and Switchyard Status,” Revision 2

Procedure NOD-QP-36, “Grid Operations and Control of Switchyard at FCS,” Revision 13,

Updated Safety Analysis Report Section 8.2, “Network Interconnections,” Revision 9

Updated Safety Analysis Report Section 8.3, “Station Distribution,” Revision 6

System Training Manual Volume 14, “Electrical Distribution System,” Revision 24