UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

October 14, 2005

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 SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT 0500285/2005011

Dear Mr. Ridenoure:

On September 2, 2005, the Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station. The enclosed safety system design and performance capability inspection report documents the findings, which were discussed with you and other members of your staff at the conclusion of the inspection.

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

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

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

Sincerely,

/RA/

Neil F. O'Keefe, Acting Chief
Engineering Branch - 1
Division of Reactor Safety

Docket: 50-285
License: DPR-40

Enclosure:
NRC Inspection Report 05000285/2005011
w/Attachments:
1. Supplemental Information
2. Information Exempt From Public Disclosure In Accordance With 10 CFR 2.390

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-285
License No.:	DPR-40
Report No.:	05000285/2005-011
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:	August 15 through September 2, 2005
Team Leader:	J. I. Tapia, P.E., Senior Reactor Inspector, Engineering Branch - 1
Inspectors:	J. Adams, Reactor Inspector, Engineering Branch - 1 J. Kirkland, Project Engineer, Projects Branch E
Accompanying Personnel:	J. Keeton, Contractor
Approved by:	N. O'Keefe, Acting Chief Engineering Branch - 1 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000285/2005011;8/15-9/2/2005; Fort Calhoun Station; Safety System Design and Performance Capability.

The report covered a 2-week period of inspection on site by a team of three region-based engineering inspectors and one contractor. Four Green findings of very low safety significance were identified during this inspection. Three of the findings were classified as noncited violations. The findings were evaluated using the significance determination process. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- Green. The team identified a noncited violation of 10 CFR 50.55a(b) for the failure to satisfy the requirements of the ASME Boiler and Pressure Vessel Code. ASME Code Section VIII, Subsection UG-10.a.3, requires that any material produced to a specification other than a Code-approved specification may be accepted provided that documentation, including the initial certification by the material manufacturer, is provided stating that the material meets all the requirements of the designated Code-approved specification. Contrary to this requirement, the licensee procured air accumulator tanks for the containment air cooling system isolation valves as commercial-grade tanks designed in accordance with Department of Transportation Specification 4BA240 and did not reconcile the requirements of this specification with the corresponding ASME Section VIII requirements.

  This finding was a performance deficiency because the licensee failed to verify and document that the accumulators satisfied ASME Code requirements. The violation is more than minor because an analysis was required in order to determine whether the tanks were acceptable for their application and was similar to Example 3.a in Manual Chapter 0612, Appendix E. The finding affected the barrier integrity cornerstone objective of providing reasonable assurance that physical design barriers, in this case the isolation valves, protect the public from radionuclide releases caused by accidents or events. The finding was of very low safety significance because an analysis indicated that code allowable stresses had not been exceeded. This issue was entered into the licensee's corrective action program as Condition Report 200504244. (Section 1R21.5(2))

Cornerstone: Mitigating Systems

- Green. The team identified a noncited violation of Fort Calhoun Technical Specification 5.8, "Procedures," for an inadequate technical specification required procedure. Technical Specification 5.8 states, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Item 6g of Appendix A to Regulatory Guide 1.33 requires a procedure to combat a loss of service water (at Fort Calhoun service water is identified as the raw water system). Contrary to this, Fort Calhoun Abnormal Operating Procedure AOP-18, "Loss of Raw Water," could not be performed as written with respect to connecting a back-up water source to the "A" component cooling water heat exchanger. The procedure required that a fire water hose be connected to the raw water drain of the "A" component cooling water heat exchanger, however, the physical orientation of the connection and limited clearance with the adjacent wall would result in the fire water hose being kinked, which would restrict flow through this heat exchanger.

  This finding was a performance deficiency because the inadequate connection was not identified during verification of the adequacy of steps in Abnormal Operating Procedure AOP-18. The finding was greater than minor because it affected the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events, in that, if left uncorrected could result in the plant not being able to sustain long-term decay heat removal under specific conditions. This finding was of very low safety significance because there has never been an event in which fire water was needed to provide backup cooling to the component cooling water heat system. This issue was entered into the licensee's corrective action program as Condition Report 200504153. (Section 1R21.5(1))

- Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III (Design Control), for an inadequate analysis used to support the use of fire water as a backup raw water source in Abnormal Operating Procedure AOP-18, "Loss of Raw Water." Specifically, the following technical errors in Calculation 203.19.05, "The Feasibility of Using Firewater for Cooling the Component Cooling Water System," Revision April 26, 1988, were identified: the licensee failed to analyze river water temperatures at a maximum inlet temperature of 90°F as described in the Updated Safety Analysis Report and instead performed the analysis with a less conservative inlet temperature of 85°F; the supporting design documentation assumed the use of two of three Component Cooling Water Heat Exchangers A, C or D (which excludes Heat Exchanger B) while Abnormal Operating Procedure AOP-18 allowed the use of any two heat exchangers, and; Abnormal Operating Procedure AOP-18 includes steps to bring the reactor coolant temperature to 300°F, however, the calculation only analyzed maintaining the reactor coolant temperature at a hot shutdown condition of 515°F.

The failure to perform adequate design analyses to support required procedures was a performance deficiency. The issue had more than minor safety significance because it impacted the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that mitigate plant accidents because the analysis did not adequately demonstrate that the use of firewater could provide proper cooling of the reactor coolant system. The finding was of very low safety significance because this backup method of cooling has never been needed, so it did not represent an actual loss of safety function. This issue has been entered into the licensee's corrective action program as Condition Report 200504328. (Section 1R21.1)

- Green. The team identified that the licensee failed to assure that the intake structure remained within the intended design conditions and, as a result, did not adequately ensure that the raw water system would function reliably. Specifically, over time, the river bottom has built up to a level 2 feet above the floor of the intake structure. This condition allowed small rocks to regularly enter the raw water system. The team noted examples where rocks had contributed to tripping the raw water strainer motors, tripped a raw water pup during starting, and impacts on the operation of the traveling screens. This change in river conditions represented a design vulnerability with a potential to cause a loss of screens and raw water pumps. Additionally, there was no formal preventive maintenance in place to sound the river bottom and no systematic analysis to assess any impact.

  This finding was more than minor because it affected the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the raw water system under accident conditions. This design condition was not contrary to any regulatory requirements or the licensing bases. Consequently, it was not considered to be a violation of a regulatory requirement. The finding was of very low safety significance because it did not represent an actual loss of safety function. However, this finding had problem identification and resolution cross-cutting aspects because of the longstanding nature of the problem. (Section 1R21.5(3))

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Introduction

The NRC conducted an inspection to verify that licensee personnel adequately preserved the facility safety system design and performance capability and that licensee personnel preserved the initial design in subsequent modifications of the systems selected for review. The scope of the review also included any necessary nonsafety-related structures, systems, and components that provided functions to support safety functions. This inspection also reviewed the licensee's programs and methods for monitoring the capability of the selected systems to perform the current design basis functions. This inspection verified aspects of the initiating events, mitigating systems, and barrier integrity cornerstones.

The licensee personnel based the probabilistic risk assessment model for the Fort Calhoun Station on the capability of the as-built safety systems to perform their intended safety functions successfully. The team determined the area and scope of the inspection by reviewing the licensee's probabilistic risk analysis models to identify the most risk significant systems, structures, and components. The team established this according to their ranking and potential contribution to dominant accident sequences and/or initiators. The team also used a deterministic approach in the selection process by considering recent inspection history, recent problem area history, and all modifications developed and implemented.

The team assessed the adequacy of calculations, analyses, engineering processes, and engineering and operating procedures that licensee personnel used for the selected safety system and the necessary support systems during normal, abnormal, and accident conditions. Acceptance criteria used by the team included NRC regulations, the technical specifications, applicable sections of the Updated Safety Analysis Report, applicable industry codes and standards, and industry initiatives implemented by the licensee's programs.

1R21 Safety System Design and Performance Capability (71111.21)

The minimum sample size for this procedure is one risk-significant system for mitigating an accident or maintaining barrier integrity. The team completed the required sample size by reviewing the raw water system. The primary review prompted parallel review and examination of support systems, such as power, instrumentation and controls, cooling and related structures and components.

.1 System Requirements

a. Inspection Scope

The team examined the process medium, energy source, control system, and equipment protection attributes of the selected systems. Procedural instructions were

reviewed to verify that instructions were consistent with actions required to meet, prevent, and/or mitigate design basis accidents. The team also considered requirements and commitments identified in the Updated Safety Analysis Report, technical specifications, design basis documents, and plant drawings.

b. Findings

Inadequate Abnormal Operating Procedure for Loss of Raw Water

Introduction. The team identified a noncited violation of Fort Calhoun Technical Specification 5.8, “Procedures,” for an inadequate technical specification required procedure. Technical Specification 5.8 states, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Item 6g of Appendix A to Regulatory Guide 1.33 requires a procedure to combat a loss of service water (at Fort Calhoun service water is identified as the raw water system). Contrary to this, Fort Calhoun Abnormal Operating Procedure AOP-18, “Loss of Raw Water,” could not be performed as written with respect to the connection of a back-up water source to the “A” component cooling water heat exchanger. The procedure required that a fire water hose be connected to the raw water drain of the “A” component cooling water heat exchanger, however, the physical orientation of the connection and limited clearance with the adjacent wall would result in the fire water hose being kinked, which would restrict flow through this heat exchanger.

Description. During the walkdown of the raw water system and associated support systems, the team noted that the raw water drain valve from the "A" component cooling water heat exchanger protruded from the heat exchanger inlet line at an awkward angle and was close to the floor. Fort Calhoun Abnormal Operating Procedure AOP-18, “Loss of Raw Water” required the use of this drain valve to supply fire water as a backup source for cooling the component cooling water heat exchangers. The procedure required connecting a 2-1/2 inch fire water hose to the drain line as the backup water supply. However, the valve angled down toward the floor and was close to a support for the "A" component cooling water heat exchanger. At this angle and with the limited clearance, a fire water hose could not be connected to the drain valve without kinking, thus, limiting the flow of water through the established path.

Analysis. This finding was a performance deficiency because the inadequate connection was not identified during verification of the adequacy of steps in Abnormal Operating Procedure AOP-18. The finding was greater than minor because it affected the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events, in that, if left uncorrected could result in the plant not being able to sustain long-term decay heat removal under specific conditions. This finding was of very low safety significance because there has never been an instance when fire water has been called upon to provide cooling to the “A” component cooling water heat exchanger. This issue was entered into the licensee’s corrective action program as Condition Report 200504153.

Enforcement. Fort Calhoun Station Technical Specification 5.8, requires that the licensee establish and implement written procedures recommended in Regulatory

Guide 1.33, Revision 2, Appendix A, February 1978, which required procedures for abnormal, off normal, or alarm conditions. Contrary to this, Fort Calhoun Abnormal Operating Procedure AOP-18, "Loss of Raw Water," was inadequate regarding connection to the "A" component cooling water heat exchanger. The procedure could not be implemented as written because a required connection between a fire water hose and the raw water drain of the "A" component cooling water heat exchanger could not be made without kinking of the fire water hose, thus, limiting the flow through this heat exchanger. The team determined this finding to be of very low safety significance because the procedure has never been required to be used. This issue was entered into the licensee's corrective action program as Condition Report Number 00504153. This violation is being treated as an noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2005011-001: Inadequate Abnormal Operating Procedure for Loss of Raw Water).

.2 System Condition and Capability

a. Inspection Scope

The team reviewed the periodic testing procedures for the selected system to verify that the capabilities of the systems were periodically verified. The team also reviewed system health reports, as well as a sample of the governing procedures and documentation for the control of calculations that were translated into values used in plant procedures. In addition, the team performed walkdowns of the selected systems to ascertain the material condition of the systems.

The team also reviewed the operation of the systems by reviewing normal, abnormal, and emergency operating procedures. The review included the Updated Safety Analysis Report, technical specifications, design calculations and drawings.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed a sample of problems associated with the selected system that were identified by licensee personnel in the corrective action program to evaluate the effectiveness of corrective actions related to design issues and aging hardware. The sample included open and closed Condition Reports and their disposition via work orders, as documented in the licensee's corrective action program. The sample covered the past 3 years and the documents reviewed are listed in the attachment to this report. Inspection Procedure 71152, "Identification and Resolution of Problems," was used as guidance to perform this part of the inspection.

b. Findings

No findings of significance were identified.

.4 System Walkdowns

a. Inspection Scope

The team performed walkdowns of the accessible portions of the selected system. The team focused on the installation, configuration, and visible material condition of equipment and components. During the walkdowns, the team assessed:

- The placement of protective barriers and systems,
- The susceptibility to flooding, fire, or environmental conditions,
- The physical separation of trains and the provisions for seismic concerns,
- Accessibility and lighting for any required operator action,
- The material condition and preservation of systems and equipment, and
- The conformance of the currently-installed system configuration to the design and licensing bases.

b. Findings

No findings of significance were identified.

.5 Design Review

a. Inspection Scope

The team reviewed the design of the raw water system. This review included an examination of design assumptions, calculations, environmental qualifications, required system thermal-hydraulic performance, electrical power system performance, control logic, and instrument set points and uncertainties. The related Updated Safety Analysis Report sections, technical specifications, system drawings, various flow tests, summaries of inservice testing results, and condition reports related to the system were also reviewed. The team also assessed the adequacy of calculations, analyses, test procedures, and operating procedures that licensee personnel used during normal and accident conditions.

b. Findings

(1) Inadequate Analysis for Using Fire Water as a Backup for Raw Water

Introduction. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III (Design Control), for an inadequate analysis used to support the use of fire water as a backup raw water source in Abnormal Operating Procedure AOP-18, “Loss of Raw Water.” Specifically, three technical errors in Calculation 203.19.05, “The Feasibility of Using Firewater for Cooling the Component Cooling Water System,” Revision April 26, 1988, were identified.

Description. During an inspection of the licensee's technical documents, the team reviewed the documents relating to actions required in the event of a loss of raw water. This consisted of reviewing Calculation 203.19.05, "The Feasibility of Using Firewater for Cooling the Component Cooling Water System," Updated Final Safety Analysis Report Section 9.8, "Raw Water System," and Abnormal Operating Procedure AOP-18, "Loss of Raw Water."

Abnormal Operating Procedure AOP-18 contained the steps to be taken in the event of a loss of raw water, which was the normal source to cool the component cooling water heat exchangers. The procedure allowed for connecting fire hoses to any two heat exchanger drain lines, and utilizing water from the fire main to provide cooling to the heat exchanger. These steps were analyzed for feasibility in Calculation 203.19.05.

The team's review of Calculation 203.19.05 found that three inadequate assumptions were used. First, the calculation assumed a maximum river inlet temperature of 85<F. This was non-conservative, in that, the Updated Safety Analysis Report stated that the maximum river inlet temperature could be as high as 90<F. Second, the calculation assumed that a combination of two of three component cooling water heat exchangers would be utilized in the event of a loss of raw water. The three heat exchangers being A, C, or D. This discounted using the B heat exchanger. However, Abnormal Operating Procedure AOP-18 allowed using any two of four heat exchangers, which included the B heat exchanger. This was non-conservative, in that, the calculation did not support all potential heat exchanger combinations that the affected procedure allows for. Finally, Step 10 of Abnormal Operating Procedure AOP-18 directed that the reactor coolant system be cooled down to 300<F. However, Calculation 203.19.05 only analyzed holding the reactor coolant system temperature at 515<F for an indefinite period of time. This was non-conservative, in that, the procedure directs the plant to be brought to a temperature that has not been adequately analyzed to prove that the system alignment would be capable of attaining the referenced reactor coolant system temperature.

Analysis. The failure to perform adequate design analyses to support required procedures was a performance deficiency. The issue had more than minor safety significance because it impacted the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that mitigate plant accidents in that not providing an adequate analysis for the use of fire water could prevent proper cooling of the reactor coolant system. This finding was of very low safety significance because this backup method of cooling has never been needed, so it did not represent an actual loss of safety function. This issue was entered into the licensee's corrective action program as Condition Report 200504328.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Contrary to the above, the licensee failed to ensure that the calculation, which supported Abnormal Operating Procedure AOP-18 used adequate assumptions. The violation was of very low safety significance and has been entered into the

licensee's corrective actions program as Condition Report 200504328. This violation is being treated as an noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2005011-002: Inadequate Analysis for Using Fire Water as a Backup for Raw Water).

(2) Failure to Reconcile Specification to ASME Code Requirements for Air Accumulators

Introduction. The team identified a noncited violation of 10 CFR 50.55a(b) for the failure to satisfy the requirements of the ASME Boiler and Pressure Vessel Code. ASME Code Section VIII, Subsection UG-10.a.3, requires that any material produced to a specification other than a Code-approved specification may be accepted provided that documentation, including the initial certification by the material manufacturer, is provided stating that the material meets all the requirements of the designated Code-approved specification. Contrary to this requirement, the licensee procured air accumulator tanks for the containment air cooling system isolation valves as commercial-grade tanks designed in accordance with Department of Transportation Specification 4BA240 and did not reconcile the requirements of this specification with the corresponding ASME Section VIII requirements.

Description. During the walkdown of the raw water system and associated support systems, the team noted that several air-operated valves in the containment cooling system had commercial-grade pressure tanks installed as air accumulators serving as backup for the instrument air system. The function of these air accumulators was to provide motive force to open the throttle valves in this system in the event that the instrument air system was not available during an accident. This containment cooling system safety function was to remove heat from containment during either a loss-of-coolant accident or a main steam line break accident, preventing over-pressurization of the containment.

The licensee procured these accumulators as commercial-grade tanks, fabricated in accordance with Department of Transportation Specification 4BA240 but failed to reconcile this specification to the ASME Code requirements to ensure the ASME Code requirements were met.

Analysis. This finding was a performance deficiency because the licensee failed to assure that the accumulators satisfied ASME Code requirements. The violation is greater than minor because an analysis was required in order to determine whether the tanks were acceptable for their application and was similar to Example 3.a in MC 0612, Appendix E. This finding affected the barrier integrity cornerstone objective of providing reasonable assurance that physical design barriers, in this case the isolation valves, protect the public from radio nuclide releases caused by accidents or events. The finding was of very low safety significance because a preliminary analysis indicated that code allowable stresses had not been exceeded. This issue was entered into the licensee's corrective action program as Condition Report 200504244.

Enforcement. 10 CFR 50.55a, "Codes and Standards," paragraph a.2, states, "Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME Boiler and Pressure Vessel Code specified in paragraphs (b), ©), (d), (e), (f), and (g) of this section." ASME Section VIII.

Part UG-10.a.3 states, “Any material produced to a specification other than a Code-approved specification may be accepted as satisfying the requirements of a specification to be designated from among those given in Section II and permitted by this Division provided that documentation, including the initial certification by the material manufacturer, is provided stating that the material meets all the requirements of the designated specification excluding the specific marking requirements.” Contrary to the above, the licensee procured and installed commercial-grade tanks, designed and fabricated in accordance with Department of Transportation Specification 4BA240, for use in the Containment Cooling System (a safety-grade system) as air accumulator tanks and did not reconcile the requirements of this specification to verify that the corresponding ASME Section VIII requirements were met. This finding does not constitute an immediate safety concern because the licensee regularly tested these accumulators in their inservice test program to confirm that they were capable of performing their safety function. This issue was entered into the corrective action program as Condition Report 200504244. This violation is being treated as an noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000285/2005011-03: Failure to Reconcile Specification to ASME Code Requirements for Air Accumulators).

(3) Potential Design Vulnerability of Intake Structure

Introduction. The team identified that the licensee failed to assure that the intake structure remained within the intended design conditions and, as a result, did not adequately ensure that the raw water system would function reliably. Specifically, over time, the river bottom has built up to a level 2 feet above the floor of the intake structure. This condition allowed small rocks to regularly enter the raw water system. The team noted examples where rocks had contributed to tripping the raw water strainer motors, tripped a raw water pup during starting, and impacts on the operation of the traveling screens. This change in river conditions represented a design vulnerability with a potential to cause a loss of screens and raw water pumps. Additionally, there was no formal preventive maintenance in place to sound the river bottom and no systematic analysis to assess any impact.

Description. The lowest elevation of the intake structure was 2 feet below that of the adjoining river bottom. As a result, a large amount of rock intrusion has resulted. This condition had increased the possibility of challenging the raw water pumps, traveling screens and strainers. The team noted that several raw water strainer rotation motor trips had resulted from this problem. During a walkdown, the team noted that the traveling screens were scooping up rocks. Also, three days after the exit meeting, an idle raw water pump tripped during an attempted start due to rocks and sand.

The team discussed the situation with the system engineer and determined that the licensee did not have a formal method of monitoring the river bottom conditions at the intake or regular preventive maintenance to sound and dredge the river bottom. Additionally, the licensee had not performed an assessment of the continuing impact of the rocks entering the system.

The problem identification aspects of this issue were turned over to the NRC team conducting the biennial problem identification and resolution inspection at the time of the

exit for this inspection. That inspection will assess the licensee's actions to identify and address this issue.

Analysis. The inspectors determined that this design vulnerability resulted from the performance deficiency of not addressing the susceptibility of the raw water system with required corrective actions. This issue was more than minor because it was associated with the Mitigating System cornerstone objective of ensuring the availability, reliability, and capability of the raw water system. The issue screened as very low safety significance because it had not resulted in a loss of system function. Specifically, the team did not identify any instances where rock intrusion had resulted in loss of the safety function of the raw water system. However, this finding had problem identification and resolution cross-cutting aspects because of the longstanding nature of the problem.

The team noted that, despite some operational impacts to the screens and strainers, and one instance of affecting an idle raw water pump, there were no documented cases where rocks had entered or impacted the remained of the system.

Enforcement. This design condition was not contrary to any regulatory requirement or the licensing basis. Consequently, this performance deficiency was not considered to be a violation of regulatory requirements and was of very low safety significance because it did not represent an actual loss of safety function (FIN 05000285/2005011-04: Potential Design Vulnerability of Intake Structure).

.6 Safety System Inspection and Testing

a. Inspection Scope

The team reviewed the program and procedures for testing and inspecting selected components for the selected systems and support systems. The review included the results of surveillance tests required by the technical specifications and a selective review of inservice tests.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA6 Management Meetings

Exit Meeting Summary

The inspection findings were presented by the team leader during an exit meeting on September 2, 2005, to Mr. J. Skiles and other members of licensee management staff. The team leader confirmed that proprietary information, while reviewed, had not been retained by the team.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

S. Baughn, Supervisor, Reactor Performance Analysis
B. Blessie, Supervisor, Operations Engineering
T. Byrne, Nuclear Licensing
G. Cavanaugh, Supervisor, Regulatory Compliance
L. Church, Raw Water/component cooling water Strategic Management Engineer
M. Core, Manager, System Engineering
D. Dryden, Training
H. Faulhaber, Division Manager, Nuclear Engineering
M. Frans, Assistant Plant Manager
R. Haug, Manager, Radiation Protection
K. Hyde, Supervisor, Mechanical Design Engineering
K. Kudlacek, Design Engineer, Mechanical Design
E. Matzke, Licensing Engineer, Regulatory Compliance
J. McManis, Manager, Licensing
S. Miller, Supervisor, System Engineering
D. Molzer, Design Engineer, Mechanical Design
R. Mueller, Supervisor, Instrumentation and Control/Electrical Design
A. Richard, Supervisor, Mechanical Systems Engineering
G. Seier, Supervisor, Procurement Engineering/Quality
J. Skiles, Manager, Design Engineering
D. Spires, Manager, Outage/Work Management
S. Swearngin, Supervisor, Reliability Engineering
M. Tesar, Division Manager, Nuclear Support Services
J. Tills, Manager, Maintenance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000285/2005 011-01	NCV	Inadequate Abnormal Operating Procedure for Loss of Raw Water (Section 1R21.5(1))
05000285/2005 011-02	NCV	Inadequate Analysis for Using Fire Water as a Backup for Raw Water (Section 1R21.1)
05000285/2005 011-03	NCV	Failure to Reconcile Specification to ASME Code Requirements for Air Accumulators (Section 1R21.5(2))

Opened

05000285/2005 011-04	FIN	Potential Design Vulnerability of Intake Structure (Section 1R215(3))
05000285/2005 011-05	URI	Intake Structure Design (Attachment 2)

LIST OF DOCUMENTS REVIEWED

The following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of the inspection and to support any findings:

Procedures

Number	Title	Revision
AOP-18	Loss of Raw Water	4
AOP-11	Loss of Component Cooling Water	9
OI-RW-1	Raw Water System Normal Operation	68
OI-CC-1	Component Cooling System Normal Operation	51
MRII-2.1	Monitoring and Reporting of SSC Availability	2
MRII-2.2	Monitoring and Reporting of SSC Reliability	3
MRII-3.1	Failure Identification and Reporting	2
MRII-6	Placement of SSC's into Category (a)(1) or (a)(2)	6
PED-QP-3	Calculation Preparation, Review and Approval	8
PED-SEI-16	Evaluation of Heat Exchanger Performance	6
PED-SEI-34	Maintenance Rule Program	4
SE-PFT-CCW-0001	Component Cooling Water Heat Exchangers Performance Test	12
SE-PFT-CCW-0002	Component AC-4A Shutdown Cooling Heat Exchanger Performance Test	5
SE-PFT-CCW-0004	SFP Heat Exchanger and Circulating Pump Performance Test	3

Number	Title	Revision
OP-PM-RW-0001	Raw Water System Interface Valve Actuation Test	4
OP-ST-RW-3001	AC-10A Raw Water Pump Quarterly Inservice Test	6/29/05
OP-ST-RW-3002A	(Q) Raw Water System Category A and B Valve Exercise Test	7/24/05
OP-ST-RW-3002B	(Q) Raw Water System Category A and B Valve Exercise Test	6/14/05
OP-ST-RW-3011	AC-10B Raw Water Pump Quarterly Inservice Test	7/13/05
OP-ST-RW-3021	AC-10C Raw Water Pump Quarterly Inservice Test	7/26/05
OP-ST-RW-3031	AC-10D Raw Water Pump Quarterly Inservice Test	6/15/05
PE-SV-VX-3008	ASME Section XI Code Relief Valve Test for the Raw Water System	1/15/03
PE-SV-VX-3008	ASME Section XI Code Relief Valve Test for the Raw Water System	1/25/01
IC-ST-AE-3111	Type C Local Leakage Rate Test of Penetrations —11 and —15	8
IC-ST-AE-3118	Type C Local Leakage Rate Test of Penetrations —18 and —19	9
IC-ST-AE-3139	Type C Local Leakage Rate Test of Penetrations —39 and —53	10
EM-PM-EX-0200A	4160 Volt Circuit Breaker Inspection	10
OP-ST-FP-0001D	Fire Protection System Inspection and Test	14

Drawings

Number	Title	Revision
11405-—10	Auxiliary Coolant Component Cooling System Flow Diagram	66
11405-—100	Raw Water Flow Diagram	88

Number	Title	Revision
11405-—12	Primary Plant Sampling System Flow Diagram	65
11405-—253	Flow Diagram Steam Generator Feedwater and Blowdown	86
11405-—254	Flow Diagram Condensate	91
11405-—257	Flow Diagram Circulating Water	80
11405-—258	Flow Diagram Turbine Plant Cooling Water System	44
11405-—259	Flow Diagram Potable & Service Water System	121
11405-—40	Auxiliary Coolant Component Cooling System Flow Diagram	36
EM-400, Sht. 1	Instrument and Control Equipment List	20
C-4175, Sht. 1	Typical Control Valve Air Source Valve Configurations	30
2C-4825	Byron Jackson Pump Division - 28 RXL-2STG.V.C.T. for Omaha Public Power	5

Condition Reports

200203985	200403683	200502822	200502962	200503650
200301019	200404037	200502841	200502963	200503450
200400063	200500081	200502844	200503018	200504311
200400454	200502760	200502870	200503315	200504313
200401648	200502772	200502876	200503431	200503431
200401660	200502816	200502888	200504153	200502330
200401757	200502817	200502926	200504284	200501644
200401885	200502818	200502950	200504291	200502428

Calculations

Number	Title	Revision
203.19.05	The Feasibility of Using Firewater for Cooling the Component Cooling Water System	April 26, 1988
SDBD-AC-RW-101	Raw Water Design Basis Document	26
EA-FC-92-057	Flooding Analysis	0
FC04177	Post-DBA Raw Water Flow	1
FC05663	Raw Water Flows - Direct Cooling Mode	3

Number	Title	Revision
FC05693	Comnponent Cooling Water System Design Heat Loads and Flows	0
FC06273	Raw Water Flows to CCW Heat Exchangers Based on Raw Water Chosen Pump Performance	0
FC06571	Off-Normal Raw Water System Alignments	1
FC06574	Raw Water System Post-DBA Performance for Normal and LCO System Alignments	0
FC06643	Evaluation of River Limits with Reduced Raw Water Pump Performance	0
FC06697	Recalculation of River Limits	0
FC06830	Minimum N2 Bottle Pressures to Meet USAR-Credited Hold Times	0
FC07066	CCW PROTO-FLO Model Compared to Measured Field Data	0

Modifications

Number	Title	Revision
EEAR-FC-78-60	Component Cooling Water Heat Exchanger	2
FC-75-71	Replacement of Component Cooling Heat Exchanger Raw Water Inlet and Outlet Valves	0
FC-76-29	Air Supply to AC/RW Interface Valves Final Design Description	1
FC-78-24	Technical Specifications for the Replacement Valve for Existing Valve HCV-2861	1
MR-FC-88-046	HCV-400 Series Valve Operator Replacement	0

Technical Specifications

Section	Title	Revision
2.16	River Level	Original
2.4	Containment Cooling	A-235

Final Safety Analysis Reports

Section	Title	Revision
9.8	Auxiliary Systems, Raw Water System	EC 28664

Miscellaneous

Number	Title	Revision
0021095001	Work Order Package	n/a
00070651	Work Request Number	n/a
System Training Manual, Vol. 25	Raw Water System	19
n/a	Control Room Log	5/4/04
n/a	Control Room Log	7/24/05
n/a	River Sounding Data	August 04-August 05
SO-G-74	Standing Order - Fort Calhoun Station EOP/AOP Generation Program	12
SO-R-2	Standing Order - Condition Reporting and Corrective Action	30
n/a	Pump and Valve Inservice Testing Program Plan, 4th Ten Year Interval Through September 25, 2013	2
EA-FC-05-017	Consequences of Liquid Flashing Within the Raw Water Discharge Header	0
EAR-94-024	RW Pump Performance	0
EAR-95-066	Uncertainty Analysis for the Heat Exchanger Testing Program	3
EAR-27057	Uncertainty Analysis for the Heat Exchanger Testing Procedure	5
TDB-III.4.1	River Level/Temperature Limits for Raw Water LCO Conditions	2