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

November 4, 2004

Randall K. Edington, Vice
President-Nuclear and CNO
Nebraska Public Power District
P.O. Box 98
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SUBJECT: COOPER NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000298/2004004

Dear Mr. Edington:

On September 23, 2004, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Cooper Nuclear Station. The enclosed integrated inspection report documents the inspection findings which were discussed on October 7, 2004, with Mr. S. Minahan, General Manager of Plant Operations, and other members of your staff.

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

Based on the results of this inspection, the NRC identified four findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC also determined that there were two violations associated with 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 these violations or significance of the 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 Cooper Nuclear 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 (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
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Docket: 50-298
License: DPR-46

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket.:	50-298
License:	DPR-46
Report:	05000298/2004004
Licensee:	Nebraska Public Power District
Facility:	Cooper Nuclear Station
Location:	P.O. Box 98 Brownville, Nebraska
Dates:	June 24 through September 23, 2004
Inspectors:	S. Schwind, Senior Resident Inspector S. Cochrum, Resident Inspector D. Carter, Health Physicist P. Elkmann, Emergency Preparedness Inspector J. Drake, Operations Engineer D. Dumbacher, Callaway Resident Inspector R. Mullikin, Senior Reactor Inspector G. Replogle, Senior Reactor Inspector
Approved By:	K. Kennedy, Chief, Branch C, Division of Reactor Projects

Enclosure

CONTENTS

SUMMARY OF FINDINGS

IR05000298/2004004; 06/24/04 - 09/23/04; Cooper Nuclear Station, Heat Sink Performance, TI 2515/159, Maintenance Rule Implementation, Operability Evaluations & Event Followup, Access Control to Radiologically Significant Areas.

The report covered a 3-month period of inspection by resident inspectors and region based inspectors. Two Green noncited violations, two Green findings, and one unresolved item were identified. The significance of the issues is indicated by their color (Green, White, Yellow, or Red) and was determined by the significance determination process in Inspection Manual Chapter 0609. Findings for which the significance determination process does not apply are indicated by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, for the failure to follow procedures for the installation of temporary shielding. During a plant tour, the inspectors identified that temporary shielding was in contact with residual heat removal system components, resulting in residual heat removal shutdown cooling being declared inoperable.

  This finding was more than minor since it affected the reactor safety mitigating systems cornerstone attribute of configuration control, but it was considered to have very low safety significance since the condition did not involve any actual loss of function to the safety-related components and did not screen as risk significant due to seismic, fire, flooding, or severe weather event. This finding has crosscutting aspects associated with problem identification and resolution based on the fact that the licensee missed several opportunities to identify and evaluate the shielding (Section 1R15).

Cornerstone: Initiating Events

- Green. A self-revealing finding was identified with the licensee's failure to perform adequate maintenance on service air compressors. Inadequate maintenance on a motor resulted in damage to the motor windings and the compressor being declared inoperable. The licensee failed to implement preventive maintenance requirements that incorporated vendor recommendations for the motor windings.

  This finding was more than minor since it affected the reactor safety initiating events cornerstone attribute of equipment performance. It was considered to be of very low safety significance since it did not contribute to the likelihood of a loss of coolant accident, contribute to the loss of mitigation equipment, nor increase the likelihood of a fire or flooding event (Section 1R12).

- Green. A self-revealing finding was identified for the failure to perform adequate maintenance on reactor feed pump limit switches. Inadequate maintenance on the reactor feed pump limit switch resulted in the Reactor Feed Pump B turbine speed decrease and an unplanned reduction in reactor power. The licensee failed to implement preventive maintenance requirements to ensure appropriate industry recommendations were incorporated in the preventive maintenance program.

  This finding was more than minor since it affected the reactor safety initiating events cornerstone attribute of equipment performance. It was considered to be of very low safety significance since it did not contribute to the likelihood of a loss of coolant accident, contribute to the loss of mitigation equipment, nor increase the likelihood of a fire or flooding event. This finding has crosscutting aspects associated with problem identification and resolution based on the fact that corrective actions for a similar limit switch failure were never implemented (Section 4OA3.2).

Cornerstone: Occupational Radiation Safety

- Green. The inspector identified a noncited violation of 10 CFR 20.1501(a) for failure to perform an adequate survey that resulted in a radiation area not being posted as required by regulations. On March 31, 2004, the licensee identified an unposted radiation area on the inside of the rain ring of Condensate Storage Tank B. The survey discovered a spot near the base of the tank that read 160 millrem per hour on contact and 8 millirem per hour at 30 centimeters. The inspector determined that the radiation area had not been identified for approximately one year.

  The finding is more than minor because it affected the cornerstone attribute (exposure control) and affected the associated cornerstone objective because it resulted in a radiation area not being posted. The finding was evaluated using the occupational radiation safety cornerstone because the finding involved the potential for unplanned or unintended dose which could have been significantly greater as a result of a single minor alteration of the circumstances. When processed through the occupational radiation safety significance determination process, the finding was found to have very low safety significance because it was not an as low as reasonably achievable finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised. This finding also had crosscutting aspects associated with human performance (Section 2OS1).

B. Licensee-Identified Violations

Violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

The plant was operating at full power at the beginning of this inspection period. On August 14, reactor power was reduced to 70 percent for planned maintenance for approximately 6 hours. On September 22, reactor power was reduced to 75 percent due to a reactor feed pump controller card failure. Reactor power remained at 75 percent for the rest of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors selected four activities representing the review of preparations for hot weather conditions on two risk significant systems (one inspection sample). The four activities included:

- A review of maintenance work orders completed in order to prepare the systems for possible high temperatures.
- A review of deficiency tags and condition reports associated with hot weather protection measures to determine their impact on the systems.
- A walkdown of the steam tunnel alternate cooling to determine if it was aligned for warm weather per procedures.
- A walkdown of the main transformers to verify that the licensee had completed the required actions identified in the work orders for warm weather.

The two systems chosen for this inspection included:

- Portions of the steam tunnel alternate cooling system
- The main transformer yard

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Equipment Alignment Inspections

a. Inspection Scope

The inspectors performed five partial equipment alignment inspections (five inspection samples). The walkdowns verified that the critical portions of the selected systems were correctly aligned per the system operating procedures. The following systems were included in the scope of this inspection:

- Reactor core isolation cooling (RCIC) system following a seismic event on July 16. The walkdown included portions of the system in the control room and RCIC pump room.

- High pressure coolant injection (HPCI) system while RCIC was out of service for planned maintenance on July 26. The walkdown included portions of the system in the control room and the HPCI pump room.

- Service Water System Loops A and B following spurious service water gland water low flow alarms on August 13. The walkdown included portions of the system in the service water pump room and the control room.

- Residual Heat Removal (RHR) System Loop B while Loop A was out of service for planned maintenance on September 8. The walkdown included portions of the system in the control room, Elevation 859 in the reactor building, and the RHR A heat exchanger room.

- Reactor Equipment Cooling System Loop A while Loop B was out of service for troubleshooting reactor equipment cooling leakage on September 23. The walkdown included portions of the system in the control room and Elevation 931 in the reactor building.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

On August 23, the inspectors performed one complete system alignment inspection of the RCIC system. The inspectors verified that the system was in the appropriate configuration per the system operating procedure and that it was installed and capable of performing its design functions as described in the Updated Safety Analysis Report. A review of maintenance work orders and corrective action documents for the past

12 months was also performed. A walkdown of the system was performed to assess material conditions, such as system leaks and housekeeping issues, that could adversely affect system operability (one inspection sample).

a. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Quarterly Walkdowns

a. Inspection Scope

The inspectors performed six fire zone walkdowns to determine if the licensee was maintaining those areas in accordance with its fire hazards analysis report (six inspection samples). The fire zones were chosen based on their risk significance as described in the individual plant examination of external events. The walkdowns focused on control of combustible materials and ignition sources, operability and material condition of fire detection and suppression systems, and the material condition of passive fire protection features. The following fire zones were inspected:

- Fire Zone 20A/B, Circulation water and service water pump room
- Fire Zone 2A/B/C, Reactor Building 903
- Fire Zone 1E, HPCI
- Fire Zone 7A, Service water booster pump room
- Fire Zone 9A, Cable spreading room
- Fire Zone 1C, RHR Pump A and C room

b. Findings

No findings of significance were identified.

.2 Annual Fire Drill

a. Inspection Scope

The inspectors observed the plant fire brigade during an unannounced fire drill on September 16 and 20 (two inspection samples) to assess the licensee's ability to fight fires. Observations focused on the following aspects of the drill:

- Protective clothing/turnout gear was properly donned.

- Self-contained breathing apparatus equipment was properly worn and used.

- Fire hose lines were capable of reaching all necessary fire hazard locations, the lines were laid out without flow constrictions, and the hose was simulated as being charged with water.

- The fire area of concern was entered in a controlled manner (e.g., fire brigade members stayed low to the floor and felt the door for heat prior to entry into the fire area of concern).

- Sufficient firefighting equipment was brought to the scene by the fire brigade to properly perform their firefighting duties.

- The fire brigade leader's firefighting directions were thorough, clear, and effective.

- Radio communications with the plant operators and between fire brigade members were efficient and effective.

- Members of the fire brigade checked for fire victims and propagation into other plant areas.

- Effective smoke removal operations were simulated.

- The firefighting preplan strategies were utilized.

- The licensee planned drill scenario was followed and the drill objectives acceptance criteria were met.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors performed an internal flood protection inspection of the cable expansion room and HPCI pump room (two samples). The inspections included a walkdown of flood protection barriers and review of procedures, the Updated Final Safety Analysis Report, selected design criteria documents, and design calculations, including:

- Cooper Nuclear Station Design Criteria Document 38, "Internal Flooding System," Revision 2

- Calculation NEDC 93-056, “Hatch Plug Flood Dam Design,” Revision 1

- Calculation NEDC 93-128, “Flooding Interaction Between Torus Area and Quads,” Revision 3

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

From September 7 to 17, 2004, the inspectors performed the biennial heat sink performance inspection. The inspectors selected three safety-related heat exchangers for this inspection, including the Division I emergency diesel generator jacket water cooler, the Division I RHR heat exchanger, and the Division I reactor equipment cooling heat exchanger.

The inspectors reviewed test, inspection, licensing, design, and vendor documents and verified that: (1) testing, inspection/maintenance and biotic fouling controls were adequate to ensure proper heat transfer; (2) acceptance criteria properly considered the differences between test/inspection conditions and design basis requirements; (3) acceptance criteria were consistent with accepted industry practices, and testing accounted for instrument uncertainties, either implicitly or explicitly; (4) the frequency of testing or inspection was adequate to detect degradation prior to loss of acceptable heat removal capabilities; (5) as-found test/inspection results were appropriately evaluated and findings were properly dispositioned; and (6) the ultimate heat sink and subcomponents demonstrated adequate performance.

The inspectors reviewed 39 service water related notifications and condition reports and verified that heat exchanger problems were properly documented, dispositioned, and corrected.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed two sessions of licensed operator requalification training in the plant simulator (two inspection samples). The training on August 31 evaluated the operators' ability to recognize, diagnose, and respond to a loss of reactor feedwater and anticipated transient without scram. The training on September 8 evaluated the operators' ability to recognize, diagnose, and respond to a loss of off-site power sources; loss of all ac power sources; and fuel cladding failure. Observations were focused on the following key attributes of operator performance:

- Crew performance in terms of clarity and formality of communications
- Ability to take timely and appropriate actions
- Prioritizing, interpreting, and verifying alarms
- Correct implementation of procedures, including the alarm response procedures
- Timely control board operation and manipulation, including high-risk operator actions
- Oversight and direction provided by the shift supervisor, including the ability to identify and implement appropriate Technical Specifications (TS) requirements, reporting, emergency plan actions, and notifications
- Group dynamics involved in crew performance

The inspectors also verified that the simulator response during the training scenario closely modeled expected plant response during an actual event.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed three equipment performance issues to assess the licensee's implementation of their maintenance rule program (three inspection samples). The inspectors verified that components which experienced performance problems were properly included in the scope of the licensee's maintenance rule program and that the appropriate performance criteria were established. Maintenance rule implementation was determined to be adequate if it met the requirements outlined in 10 CFR 50.65 and Administrative Procedure 0.27, "Maintenance Rule Program," Revision 15. The inspectors reviewed the following equipment performance problems:

- Failure of the HPCI exhaust drain pot level switch on June 1 (Notification 10318719)
- Failure of the Service Air Compressor B motor on July 19 (Notification CR-CNS-2004-00520)
- Failure of the Service Air Compressor A air load regulator on August 4 (Notification CR-CNS-2004-05499)

b. Findings

Introduction. The failure to perform adequate maintenance on the motor for Service Air Compressor B was considered to be a Green, self-revealing finding.

Description. On July 19, station operators shifted service air compressors so that Service Air Compressor B was in run and Service Air Compressors A and C were in standby. After approximately 8 minutes, the operators detected an acrid odor and observed smoke in the room. The operator notified the control room of this and the compressor was secured. There were no signs of an active fire and the compressor was declared inoperable pending troubleshooting and corrective maintenance.

Cooper Nuclear Station is equipped with three service air compressors which also supply the instrument air system. One compressor is normally running while the other two compressors are in standby.

Condition Report CR-CNS-2004-00520 was initiated to document this occurrence and to determine the apparent cause of the motor failure. The immediate corrective action was to replace the motor on Service Air Compressor B with a spare motor. Subsequent inspections of the failed motor revealed burnt insulation on the windings and some melting of the windings. The licensee determined that this motor was original to the compressor and had approximately 30 years of service life. In addition, the windings were coated with an oily substance and covered with dust and dirt. The vendor manual for this motor (GE Custom 8000 horizontal induction motors) recommends that the motor windings be kept free from dirt, oil, and grease. This, along with age-related degradation of the motor windings, contributed to the motor failure on July 19. The licensee was unable to identify an existing preventive maintenance activity to periodically clean and inspect or recondition the motor for Service Air Compressor B. The licensee also evaluated the extent of this condition and determined that the motors for Service Air Compressors A and C were not likely to experience similar failures since these motors had been replaced within the last 6-8 years. These motors were replaced due to similar winding failures. The licensee had already initiated a project to replace all three air compressors.

The licensee reviewed this failure against the scope of the maintenance rule and concluded that it represented a maintenance preventable functional failure of the system. The system was already being monitored according to the requirements of paragraph a(1) of 10 CFR 50.65 due to failures of instrument air accumulator check valves. The inspectors concluded that failures of these check valves and the associated corrective actions were sufficiently dissimilar and no violation of 10 CFR 50.65 occurred.

Analysis. The failure to establish an adequate maintenance program for a risk significant system, namely the service air compressors, was considered a performance deficiency. This finding affected the reactor safety initiating events cornerstone attribute of equipment performance and was considered more than minor since it increased the likelihood of an initiating event (loss of instrument air). Based on the results of a

significance determination process, Phase 1, evaluation, the finding was determined to have very low safety significance (Green) since it did not contribute to the likelihood of a loss of coolant accident, the loss of mitigating systems, or a fire or flooding event.

Enforcement. The service air compressors are not considered to be safety related; therefore, no violation of NRC requirements was identified. The licensee entered this finding into their corrective action program as Resolve Condition Report CR-CNS-2004-00520. This finding is identified as FIN 05000298/2004004-01, Inadequate Preventive Maintenance on Service Air Compressor A.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed five risk assessments for planned or emergent maintenance activities to determine if the licensee met the requirements of 10 CFR 50.65(a)(4) for assessing and managing any increase in risk from these activities (five inspection samples). Evaluations for the following maintenance activities were included in the scope of this inspection:

- Corrective maintenance on Service Air Compressor B to repair motor insulators on July 20 (Work Order 4391165).
- Corrective maintenance on Service Air Compressor A to repair an air load regulator on August 4 (Work Order 4393905).
- HPCI surveillances during abnormal plant conditions on August 20.
- Online risk assessment for the week of August 30.
- Troubleshooting on reactor equipment cooling system leakage on September 21 (Work Order 4400528).

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Evolutions

a. Inspection Scope

For the nonroutine events described below, the inspectors reviewed operator logs, plant computer data, and strip charts to determine what occurred, how the operators responded, and whether the response was in accordance with plant procedures (two inspection samples):

- On June 25, the inspectors reviewed the site response to a one-half scram that occurred during the conduct of Procedure 6.2RPS.308, "North SDV High Water Level Switches and Transmitters Examination and Channel Calibration (DIV 2)." The licensee determined that the one-half scram resulted from the bumping of a scram discharge volume limit switch during installation of the switch cover. The licensee performed an examination of the switch and found no additional problems. The inspectors verified that operator response was in accordance with station procedures and plant conditions.

- On July 16, the inspectors responded to the control room and observed site response to a minor earthquake felt in Nemaha County, Nebraska. The earthquake measured less than .01 g's in the control room. The inspectors verified that operator response was in accordance with station procedures and monitored plant conditions following the earthquake. In addition, the inspectors conducted walkdowns of safety-related equipment in the reactor building. No abnormal conditions or discrepancies were noted following completion of the walkdowns.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed four operability determinations associated with mitigating system capabilities to ensure that the licensee properly justified operability and that the component or system remained available so that no unrecognized increase in risk occurred (four inspection samples). These reviews considered the technical adequacy of the licensee's evaluation and verified that the licensee considered other degraded conditions and their impact on compensatory measures for the condition being evaluated. The inspectors referenced the Updated Safety Analysis Report, TSs, and the associated system design criteria documents to determine if operability was justified. The inspectors reviewed the following equipment conditions and associated operability evaluations:

- Average power range monitor spiking (Notification 10310727)

- Nonseismic temporary radiation shielding installation (Notification 10315931)

- Loose electrical panel fasteners (Notification 10322990)

- Underground emergency diesel generator fuel line corrosion (Notification 10335596)

b. Findings

Introduction. The inspectors identified a Green noncited violation of (NCV) 10 CFR Part 50, Appendix B, Criterion V, in that the licensee failed to follow procedures for the installation of temporary radiation shielding.

Description. During a plant tour on May 17, the inspectors identified that temporary radiation shielding installed on scaffolding erected in the reactor building northwest 881 level was in direct contact with the RHR shutdown cooling suction header pressure sensing instrument (RHR-PS-118) and its associated sensing line. The shielding had been erected to reduce dose during maintenance performed in June 2001 and had been left in place to provide additional dose reduction from RHR piping in the area. After contacting radiation protection and engineering personnel, the inspectors questioned the seismic qualification of the instrumentation and sensing line.

The following day, the inspectors observed a surveillance in the vicinity of the temporary shielding and noticed horizontal movement of the scaffolding and shielding. It was brought to the attention of the control room operators that the shielding blankets were in contact with safety-related equipment, and the scaffolding that was in close proximity to safety-related equipment appeared degraded. The inspectors again questioned the seismic qualification of the RHR components in the area. In response, the licensee initiated Notification 10315931 to document this condition.

On May 19, the licensee conducted a walkdown of the shielding and scaffolding, noted that the shielding was not installed per seismic requirements, and declared RHR shutdown cooling inoperable per TS 3.4.7; however, no actions were required since the plant was in Mode 1 operation. This condition created a potential for damage of safety-related components during a postulated seismic event. Engineering Procedure 3.14, “Temporary Shielding,” Revision 13, states that the shielding engineering evaluation will evaluate the location of the shielding and record the pipe or component load. Shielding engineering Evaluation 01-01 had evaluated the installation for contact with large bore RHR piping. However, the engineering evaluation, 10 CFR 50.59 review, and safety-assessment review did not address the shielding contact with the pressure sensing instrument or its associated line nor had a seismic interaction evaluation been performed.

The licensee immediately rearranged the shielding blankets to eliminate contact with the instrument and sensing line. The operators subsequently exited TS 3.4.7 and restored the RHR shutdown cooling system to operable status. Additional bracing was added to restore the scaffolding to a acceptable condition. Engineering personnel concluded that the condition would have caused the RHR shutdown cooling pressure instrument and sensing line to fail during a postulated design basis seismic event, creating an operator challenge and workaround. Although contact between the shielding and the safety-related components existed, no loss of safety function occurred.

Analysis. The inspectors determined that the licensee's failure to evaluate the shielding contact with safety-related components per applicable procedures constituted a performance deficiency. This issue affected the reactor safety mitigating systems cornerstone attribute of configuration control and was more than minor because improperly installed shielding near safety-related components could affect the function of the components during a design basis seismic event. Based on the results of a significance determination process, Phase 1, evaluation, the finding was determined to have very low safety significance (Green) since the condition did not involve any actual loss of function to the safety-related components and did not screen as risk significant due to seismic, fire, flooding, or severe weather event.

This finding has crosscutting aspects associated with problem identification and resolution. The licensee's apparent cause determination identified that the original shielding engineering evaluation dated June 12, 2001, had failed to evaluate shielding contact with RHR piping. However, a revised shielding engineering evaluation dated March 18, 2002, only evaluated contact with large bore piping and failed to identify the shielding contact with the RHR shutdown cooling pressure instrument and its associated sensing line. Additionally, it was noted that this installation was inspected in June 2003 and no deficiencies were identified.

Enforcement. Appendix B, Criterion V, 10 CFR Part 50, states, in part, that activities affecting quality shall be prescribed by procedures and shall be accomplished in accordance with these procedures. Contrary to this requirement, engineering personnel did not properly implement procedural requirements for the installation and evaluation of shielding in contact with safety-related systems. Because this violation was of very low safety significance and was entered into the corrective action program as Resolve Condition Report 2004-0377, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000298/2004004-02, Failure to Follow Temporary Shielding Procedure.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors performed a review of the digital electrohydraulic turbine demand display failure in the control room as an operator workaround item (one inspection sample). The inspectors evaluated it's affect on mitigating systems and the operators' ability to implement abnormal or emergency procedures. In addition, open operability determinations and selected condition reports were reviewed and operators were interviewed to determine if there were additional degraded or nonconforming conditions that could complicate the operation of plant equipment.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors reviewed or observed five selected postmaintenance tests (five inspection samples) to verify that the procedures adequately tested the safety function(s) that were affected by maintenance activities on the associated systems. The inspectors also verified that the acceptance criteria were consistent with information in the applicable licensing basis and design basis documents and that the procedures were properly reviewed and approved. Postmaintenance tests for the following maintenance activities were included in the scope of this inspection:

- Alternate steam tunnel cooling system installation on July 26 (Work Order 4386198)
- RCIC planned maintenance on July 27 (Work Order 4359706)
- Service Water Pump D planned maintenance on August 30 (Work Order 4388575)
- RHR MO-39B valve planned maintenance on August 31 (Work Order 4324181)
- Service Water Relay TD-89B replacement on August 31 (Work Order 4324117)

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the following six surveillance tests (six inspection samples) to ensure that the systems were capable of performing their safety function and to assess their operational readiness. Specifically, the inspectors verified that the following surveillance tests met TS requirements, the Updated Safety Analysis Report, and licensee procedural requirements:

- 15.HV.102, “TSC Emergency Fan Charcoal and HEPA Filter Leak Test, Fan Capacity Test, and Charcoal Sampling,” Revision 3, performed on June 3
- SP04-001, “Control Room Envelope Integrity Test,” Revision 1, during the isolation mode in-leakage test performed on July 9
- 6.2CS.702, “CS Loop B Pump Time Delay Channel Functional Test (DIV 2),” Revision 2, performed on July 9

- SP04-001, “Control Room Envelope Integrity Test,” Revision 1, during the emergency pressurization mode in-leakage test performed on July 10
- 6.HPCI.103, “HPCI IST [inservice test] and 92 Day Test Mode Surveillance Operation,” Revision 25, performed on July 21
- 6.FP.606, “Fire Barrier/Fire Wall Visual Inspection,” Revision 8, performed on July 22

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed two temporary plant modifications (two inspection samples). The inspectors verified that the changes did not require NRC approval prior to implementation, and adequate controls on the installation existed.

- Work Order 4384485 (alternate steam tunnel cooling system), implemented on July 20, installed an air distribution system and an external chilled water system outside the steam tunnel to provide additional cooling to the steam tunnel during periods of elevated temperatures.
- Work Order 4391516 (temporary piping re-enforcement canister), implemented on July 21, installed a canister filled with grout material around circulating water Pump D bearing oil cooler turbine equipment cooling piping that was corroded to provide additional structural margin.

b. Findings

No findings of significance were identified.

1EP1 Exercise Evaluation

a. Inspection Scope

The inspectors reviewed the objectives and scenario for the 2004 biennial emergency plan exercise to determine if the exercise would acceptably test major elements of the emergency plan. The scenario simulated reactor coolant leakage, an in-plant spill of radioactive material, unisolable steam leaks, failure of the reactor to shut down as required, core damage caused by a loss of reactor vessel water level, and a monitored radiological release from the steam tunnel to the environment through the reactor building to demonstrate the licensee's capabilities to implement the emergency plan.

The inspectors evaluated exercise performance by focusing on the risk-significant activities of classification, notification, protective action recommendations, and offsite dose consequences in the following emergency response facilities:

- Simulator control room
- Technical support center
- Operations support center
- Emergency operations facility

The inspectors also assessed personnel recognition of abnormal plant conditions, the transfer of emergency responsibilities between facilities, communications, protection of emergency workers, emergency repair capabilities, and the overall implementation of the emergency plan.

The inspectors attended the postexercise critiques in each of the above facilities to evaluate the initial licensee self-assessment of exercise performance. The inspectors also discussed the licensee's final evaluation of exercise performance with plant management.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspectors performed an onsite review of Revision 47 to the Cooper Nuclear Station Emergency Plan, implemented on May 3, 2004. This revision made changes to offsite assembly locations and corrected minor administrative errors. The revision was compared to its previous revision to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, and to the requirements of 10 CFR 50.47(b) and 50.54(q) to determine if the revision decreased the effectiveness of the plan.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed the licensee perform two emergency preparedness drills on June 30 and August 25 (two inspection samples). Observations were conducted in the control room, technical support center, and emergency operations facility. During the drill, the inspectors assessed the licensee's performance related to classification, notification, and protective action recommendations. Following the drill, the inspectors reviewed the licensee's critique to determine if issues were appropriately identified and documented. The following documents were reviewed during this inspection:

- Emergency plan for Cooper Nuclear Station
- Emergency plan implementing procedures for Cooper Nuclear Station
- Cooper Nuclear Station emergency preparedness drill scenario for June 30 and August 25

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety (OS)

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

This area was inspected to assess the licensee's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspector used the requirements in 10 CFR Part 20, the TSs, and the licensee's procedures required by TSs as criteria for determining compliance. During the inspection, the inspector interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspector performed independent radiation dose rate measurements and reviewed the following items:

- Controls (surveys, posting, and barricades) of three radiation, high radiation, or airborne radioactivity areas
- Radiation work permit, procedure, engineering controls, and air sampler locations

- Conformity of electronic personal dosimeter alarm setpoints with survey indications and plant policy and workers' knowledge of required actions when their electronic personnel dosimeter noticeably malfunctions or alarms

- Physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools

- Self-assessments and audits related to the access control program since the last inspection

- Corrective action documents related to access controls

- Special radiation work permit briefings and worker instructions

- Adequacy of radiological controls such as required surveys, radiation protection job coverage, and contamination controls during job performance

- Dosimetry placement in high radiation work areas with significant dose rate gradients

- Controls for special areas that have the potential to become very high radiation areas during certain plant operations

- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements

The inspector reviewed the following areas; however, because the conditions did not exist or an event had not occurred, there were no specific examples to review:

- Performance indicator (PI) events and associated documentation packages reported by the licensee in the occupational radiation safety cornerstone

- Barrier integrity and performance of engineering controls in airborne radioactivity areas

- Adequacy of the licensee's internal dose assessment for any actual internal exposure greater than 50 millirem committed effective dose equivalent

- Licensee event reports (LERs) and special reports related to the access control program since the last inspection

- Licensee actions in cases of repetitive deficiencies or significant individual deficiencies

- Changes in licensee procedural controls of high dose rate - high radiation areas and very high radiation areas

The inspector completed 21 of the required 21 samples.

b. Findings

Introduction. A Green NCV of 10 CFR 1501(a) was identified by the inspector. The licensee failed to adequately perform a radiation survey to identify a radiation area.

Description. While conducting a radiation survey on March 31, 2004, the licensee identified an unposted radiation area on the inside of the rain ring of Condensate Storage Tank B. Dose rates on a spot near the base of the tank were 160 millrem per hour on contact and 8 millirem per hour at 30 centimeters. The licensee assigned a second technician to confirm the radiation levels; however, the technician had difficulty finding the source and had to be shown the area by the first technician. This demonstrated that the radiation area could be overlooked if not surveyed carefully.

The licensee stated that the tank sits idle between refueling outages and that the last time water was transferred was in March of 2003. The first radiation survey performed after the outage was performed on September 30, 2003. The survey results indicated that radiation dose rates were 2 millirem per hour at 30 centimeters.

Because no additional evolution had occurred to alter the radiological conditions, the inspector concluded that the licensee had not adequately surveyed or evaluated the changing radiological conditions and potential hazards after the last tank evolution in March 2003. Additionally, the inspector concluded the licensee missed another opportunity to identify the radiation area during the radiation survey conducted in September 2003. Therefore, the radiation area was not identified for approximately one year. The licensee took immediate corrective actions to post the area and increased the survey frequency from semiannually to monthly.

Analysis. The finding is more than minor because it affected the cornerstone attribute (exposure control) and affected the associated cornerstone objective because it resulted in a radiation area not being posted. The finding was evaluated using the occupational radiation safety cornerstone because the finding involved the potential for unplanned or unintended dose which could have been significantly greater as a result of a single minor alteration of the circumstances. When processed through the occupational radiation safety significance determination process, the finding was found to have very low safety significance because it was not an ALARA (as low as is reasonably achievable) finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised.

The finding had crosscutting aspects associated with human performance since radiation protection technicians failed to conduct an adequate survey. The finding also had crosscutting aspects associated with PIR in that the licensee's corrective actions did not address that the localized spot of radiation was difficult to detect.

Enforcement. Pursuant to 10 CFR 20.1003, *survey* means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. 10 CFR 20.1501 requires that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in 10 CFR Part 20 and that are reasonable under the circumstances to evaluate the extent of radiation levels and the potential radiological hazards that could be present. The licensee violated this requirement when it did not perform a survey to comply with the requirements of 10 CFR 20.1902. Because the failure to survey was determined to be of very low safety significance and has been entered into the licensee's corrective action program as Condition Report 2004-0241, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000298/2004004-03, Failure to perform an adequate survey.

4. OTHER ACTIVITIES (OA)

4OA1 PI Verification

a. Inspection Scope

The inspectors sampled five licensee PIs listed below for the period July 2003 through June 2004 (five inspection samples). The definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, were used to verify that the licensee accurately reported performance indicator data during the assessment period. Licensee performance indicator data was reviewed against the requirements of Procedure 0-PI-01, "Performance Indicator Program," Revision 16.

Reactor Safety Strategic Area

- Heat removal system
- Safety system functional failures
- Drill and exercise performance
- Emergency response organization participation
- Alert and notification system reliability

The inspectors reviewed a selection of LERs, portions of operator log entries, monthly reports, and PI data sheets to determine whether the licensee adequately collected, evaluated, and distributed PI data for the period reviewed. The inspectors reviewed a sample of drill and exercise scenarios and licensed operator simulator training sessions, notification forms, and attendance and critique records associated with training sessions, drills, and exercises conducted during the verification period. The inspectors reviewed a

5 percent sample of emergency responder qualification, training, and drill participation records. The inspectors reviewed alert and notification system testing procedures, maintenance records, and a 100 percent sample of siren test records. The inspectors also interviewed licensee personnel responsible for collecting and evaluating PI data.

Occupational Radiation Safety Cornerstone

- Occupational Exposure Control Effectiveness PI

Licensee records reviewed included corrective action documentation that identified occurrences of locked high radiation areas (as defined in the licensee's TSs), very high radiation areas (as defined in 10 CFR 20.1003), and unplanned personnel exposures (as defined in NEI 99-02). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspector interviewed licensee personnel that were accountable for collecting and evaluating the PI data. In addition, the inspector toured plant areas to verify that high radiation, locked high radiation, and very high radiation areas were properly controlled.

Public Radiation Safety Cornerstone

- Radiological Effluent TS/Offsite Dose Calculation Manual Radiological Effluent Occurrences

Licensee records reviewed included corrective action documentation that identified occurrences for liquid or gaseous effluent releases that exceeded PI thresholds and those reported to the NRC. The inspector interviewed licensee personnel that were accountable for collecting and evaluating the PI data.

b. Findings

The inspectors determined the licensee was inappropriately giving emergency response organization participation credit as Shift Manager (Emergency Director) to those senior reactor operators standing the control room supervisor watch position. The inspectors verified that the licensee's emergency response organization participation PI would remain in the Green color band after adjustment for the personnel given inappropriate participation credit.

4OA2 Identification and Resolution of Problems

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed a selection of condition reports written during this period to determine if the licensee was entering conditions adverse to quality into the corrective action program at an appropriate threshold, to determine if the condition reports were

appropriately categorized and dispositioned in accordance with the licensee's procedures, and, in the case of conditions significantly adverse to quality, to determine if the licensee's root cause determination and extent of condition evaluation was accurate and of sufficient depth to prevent recurrence of the condition. The following condition report was reviewed in depth during this period (one sample):

- CR-CNS-2004-05914 (Resolve Condition Report 2004-0577) regarding a degraded underground diesel generator fuel line on August 17

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness Annual Sample Review

a. Inspection Scope

The inspectors reviewed eight licensee drill reports for the period June 2003 through August 2004. The reports were reviewed to determine whether drill and exercise performance problems were appropriately captured in the corrective action process and to identify performance trends and repetitive problems.

b. Findings

There were no findings or observations identified.

.3 Crosscutting Aspects of Findings

Sections 1R15, 4OA3.2, and 4OA5.2 describe findings with crosscutting aspects associated with problem identification and resolution.

Section 2OS1 evaluated the effectiveness of the licensee's problem identification and resolution processes regarding access controls to radiologically significant areas and radiation worker practices. The inspector reviewed the corrective action documents listed in the attachment against the licensee's problem identification and resolution program requirements. The inspector identified a narrowly focused corrective action implemented in response to a failure to survey and identify a radiation area.

4OA3 Event Followup

.1 (Closed) LER 05000298/2004003-00, High Pressure Coolant Injection Pump Inoperability Results in Loss of Safety Function

On June 1, 2004, the control room received an alarm indicating a high level in the HPCI exhaust drain pot. Operators took manual action to drain the pot; however, the high level alarm would not clear. Since the condition of the drain pot could not be determined,

operators conservatively declared HPCI inoperable and placed the control switch for the auxiliary oil pump in the pull to lock position. This action prevented HPCI from auto-starting and resulted in a loss-of-safety function. This condition was documented in the corrective action program as Significant Condition Report 2004-0396. Subsequent investigation revealed that the level switch for the exhaust drain pot had become misaligned and that the drain pot level was actually acceptable. No performance deficiency was identified regarding the misaligned level switch. This LER is closed.

.2 Transient due to Loss of Reactor Feed Pump B

a. Inspection Scope

The inspectors performed a followup inspection regarding a plant transient which occurred on May 2, 2004. The transient was caused by a loss of Reactor Feed Pump B due to a stop-valve limit switch failure which resulted in a Reactor Feed Pump B trip condition. This followup inspection included a review of vendor information for the limit switch, a review of the preventive maintenance program, a review of the licensee's root cause determination, and interviews with licensee personnel.

b. Findings

Introduction. A self-revealing, Green finding was identified regarding the failure to perform adequate maintenance on Reactor Feed Pump B limit switches.

Details. On May 2, 2004, the Reactor Feed Pump B control system received a false trip signal due to the failure of the limit switch for the Reactor Feed Pump B stop valve. The limit switch failure caused Reactor Feed Pump B speed to drop, which resulted in a plant transient and subsequent reduction in reactor power to 70 percent. The apparent cause, which was later confirmed by the licensee's root cause analysis, was the fact that the limit switch had aged to the point where the terminals and contacts were corroded, and the internal wiring was cracked and frayed. This resulted in increased resistance across terminals and contacts which eventually led to the limit switch failure, causing a false trip signal to be sent to the reactor feed pump control system. After conducting repairs, Reactor Feed Pump B was restarted and the reactor was restored to full power operations on May 7.

On November 11, 2002, a similar failure occurred on a block valve limit switch during startup of Reactor Feed Pump B. Cleaning and burnishing the terminals and contacts was completed to fix the problem; however, the switch was not replaced. The licensee conducted an apparent cause determination for this failure which discovered that a preventive maintenance program did not exist for the limit switch and recommended a preventive maintenance program be established for all the limit switches in the reactor feed pump control system. This was based on industrial guidance that recommended accessory component replacement at the same time the main component is serviced or overhauled. The reactor feed pumps are scheduled to be overhauled every 5 years. The apparent cause determination also recommended the replacement of both Reactor Feed

Pumps A and B limit switches in Refueling Outage 21. Work orders were generated to replace the limit switches but were given low priority and deferred several times before being scheduled for Refueling Outage 22 in January 2005.

In addition, on April 24, the Reactor Feed Pump B limit switch gave intermittent false signals indicating that the stop valve was not fully open. This condition was verified by the licensee to be a limit switch fault. A work order was generated but was given a low priority and was not scheduled for work at the time of the May 2 failure.

The inspectors reviewed the root cause analysis for this event, which was documented in Significant Condition Report 2004-0322. The licensee determined that the root cause of this event was the lack of sensitivity to power generation equipment and referenced Significant Condition Report 2003-1957, which contained the same root cause. The investigation also determined that the failure to implement recommended maintenance and monitoring plans in the preventive maintenance program were contributing causes and referenced a contributing cause in Significant Condition Report 2003-1957, which contained a corrective action to establish programmatic controls to ensure appropriate industry recommendations were incorporated in the preventive maintenance program. At the time of the May 2 failure, the limit switches on both reactor feed pumps had been in service for 30 years and the recommended preventive maintenance had not been implemented. The Reactor Feed Pump B limit switches were replaced following the failure. The Reactor Feed Pump A limit switches are scheduled for the next refueling outage.

Analysis. The lack of an adequate preventive maintenance program for reactor feed pump limit switches was considered a performance deficiency which affected the reactor safety initiating events cornerstone. This finding was considered more than minor since it affected the cornerstone attribute of equipment performance and actually induced a plant transient. Based on the results of a significance determination process, Phase 1 evaluation, the finding was determined to have very low safety significance (Green) since it did not contribute to the likelihood of a primary or secondary system loss of coolant accident, contribute to a loss of mitigation equipment, nor increase the likelihood of a fire or internal/external flood.

This finding has crosscutting aspects associated with problem identification and resolution. This assessment was based on the fact that the licensee had identified corrective actions from November 2002 that were not effectively implemented in a timely manner to prevent recurrence in May 2004.

Enforcement. The components affected by this finding were not considered safety-related; therefore, no violation of NRC requirements was identified. The licensee entered this finding into their corrective action program as Significant Condition Report 2004-0322. This finding is identified as FIN 05000298/2004004-04, Inadequate Preventive Maintenance on Reactor Feed Pump Limit Switches.

4OA4 Crosscutting Aspects of Findings

Section 2OS1 described a violation with human performance crosscutting aspects which involved a failure to survey.

4OA5 Other Activities

.1 Third-Party Reviews

The inspectors reviewed a third-party assessment report for Cooper Nuclear Station, dated July 2004, and noted it did not contain any previously unidentified safety issues.

.2 Temporary Instruction 2515/159 : Review of Generic Letter 89-13: "Service Water System Problems Affecting Safety-Related Equipment"

Per Temporary Instruction 2515/159, this report section is an approved one-time deviation from the NRC's normal report format specified in NRC Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," dated January 14, 2004.

The purpose of this inspection is to help the NRC evaluate licensee activities associated with historical operating experience and NRC generic communications. Generic Letter 89-13 was selected as the focus for Temporary Instruction 2515/159 because service water systems have a dominant role in plant risk profiles and the recommendations made in Generic Letter 89-13 are important to plant safety. The temporary instruction requires the inspectors to verify that licensees continue to properly implement programs and commitments associated with the generic letter. The NRC will assess the need for future regulatory actions based on the results of these inspections.

The inspectors evaluated the following five topical areas:

a. The Effectiveness of Generic Letter 89-13 in Communicating Information

Generic Letter 89-13 was clear in communicating information about service water system problems, both in the initial letter and the supplement. The licensee did take the actions to which it officially committed in its response. The inspector found no problems with ambiguity in the generic letter's guidance or the licensee's interpretation of the guidance.

b. Licensee Actions that are Being Implemented for the Five Recommended Actions of Generic Letter 89-13

Recommendation 1: For Open-Cycle Service Water Systems, Implement and Maintain an Ongoing Program of Surveillance and Control Techniques to Significantly Reduce the Incidence of Flow Blockage Problems as a Result of Biofouling

The inspectors found that the licensee continued to properly implement this recommendation. The licensee periodically inspected service water heat exchangers and

the plant intake structure on a periodicity consistent with the generic letter recommendations regarding biofouling.

As part of this inspection, the inspectors reviewed the licensee's responses to Generic Letter 89-13 and the operational history of the service water system for the past two operating cycles. The inspectors also reviewed the implementation of the periodic inspection program and procedures to detect flow blockages from biofouling. The inspectors further reviewed related LERs, condition reports, maintenance work requests, maintenance procedures, and heat exchanger test results. The primary cause of flow blockage at Cooper was silt accumulation, which is addressed in Recommendation 3.

Recommendation 2: Implement a Test Program for the Heat Transfer Capability of all Safety-Related Heat Exchangers Cooled by the Service Water System

The licensee continued to properly implement this recommendation. Generic Letter 89-13 recommended thermal performance testing or a maintenance/inspection program to periodically verify heat exchanger operability. The licensee had either performed periodic thermal testing or maintenance/inspection consistent with the generic letter's recommendations. The inspectors selected four heat exchangers for review in validating the licensee's program. The heat exchangers included: (1) RHR (thermal performance testing and maintenance\inspection); (2) reactor equipment cooling (thermal performance testing and maintenance\inspection); (3) emergency diesel generator jacket cooling water (maintenance\inspection); and (4) emergency diesel generator lube oil cooling (maintenance\inspection).

The inspectors reviewed the design basis of the service water system and related heat exchangers. This effort included review of the safety analysis report, safety evaluation report, drawings, calculations, TSs, design basis manual, procedures, and training documents of these systems. The inspectors verified that the licensee utilized appropriate acceptance values for fouling and tube plugging and that testing demonstrated design basis capabilities. The inspectors reviewed the applicable calculations to ensure that the thermal performance test acceptance criteria for the heat exchangers were being applied consistently throughout the calculations. Where maintenance and inspection were performed in lieu of testing, the inspectors verified that the activities provided reasonable assurance of heat exchanger operability.

Recommendation 3: Ensure by Establishing a Routine Inspection and Maintenance Program for Open-Cycle Service Water System Piping and Components that Corrosion, Erosion, Protective Coating Failure, Silting, and Biofouling Cannot Degrade the Performance of the Safety-Related Systems Supplied by Service Water

The inspectors determined that the licensee had established satisfactory programs to address this recommendation, but program implementation was sometimes inconsistent. The licensee had established a program for controlling biofouling, erosion, and corrosion. The licensee had also developed generally adequate maintenance and inspection

procedures to ensure that protective coatings failure, silting, and biofouling cannot degrade the performance of the service water system and related heat exchangers. The inspectors reviewed the results of those inspections.

With respect to implementation, the inspectors observed that the licensee had the following related issues in the past 3 years:

- Service water minimum pipe wall thickness was below ASME allowables before the licensee performed repairs (NRC Inspection Report 50-298/2001-08).

- Failure to properly analyze erosion and corrosion of the service water system (NRC Inspection Report 50-298/2001-08).

- Failure to properly analyze coating that was applied to service water pipe riser columns (NRC Inspection Report 50-298/2002-02).

Recommendation 4: Verify that the Service Water System Will Perform its Intended Function in Accordance with the Design Basis for the Plant

The licensee generally continued to meet this recommendation for the service water system. As noted in response to Recommendations 1, 2, and 3, the inspectors verified that the licensee had performed adequate thermal performance testing and maintenance/inspections to ensure service water operability. In addition, the inspectors verified that flow balance surveillances ensured adequate flow to all necessary components. The inspectors performed a walkdown of portions of the service water system, including the selected system heat exchangers, to verify the material condition of the systems. The inspectors observed component lubrication, deficiency tags, and general equipment condition.

The inspectors reviewed a sample of service water related modifications. While reviewing a modification associated with permanently removing service water cooling from the emergency diesel generator room coolers, the inspectors identified that the licensee had not properly identified conditions adverse to quality:

Introduction. The inspectors identified an unresolved item associated with the failure to promptly identify conditions adverse to quality when plant temperatures were outside the Updated Safety Analysis Report specified range. The system engineer knew of the problems but was not aware of the corrective action program requirements. The failure to properly identify conditions adverse to quality in the Cooper corrective action program was a performance deficiency. This issue involves crosscutting aspects of problem identification and is unresolved pending receipt of information necessary to perform a significance determination.

Discussion. While reviewing Modification CED 6005426, “Diesel Generator Cooling Requirements Upgrade,” which was a modification that removed service water cooling to the emergency diesel generator rooms, the inspectors identified that the licensee had

failed to properly address conditions adverse to quality. The Cooper Updated Safety Analysis Report states, in part, that "The design of the Station heating, ventilating, and air conditioning systems are based on a minimum outdoor temperature of -5°F . . . and a maximum outdoor temperature of 97°F . . ." The inspectors reviewed historical plant temperature data and noted that, in the last 2 years, site temperatures had exceeded the 97°F limit on 12 occasions and had dipped below the -5°F threshold 5 times. During this same period, plant temperatures were as high as 104°F and as low as -10°F. Operation of the plant outside the Updated Safety Analysis Report specifications constitutes a nonconforming condition and a condition adverse to quality. However, the licensee had failed to enter the problems into their corrective action program.

Plant areas that directly rely on outside air for temperature control, during design basis accidents, include the emergency diesel generator rooms, portions of the reactor building, the control room (pressurization mode), and the control building. The licensee had not performed a past operability evaluation by the close of this inspection. At this time of year, however, outside temperatures were well within the design specifications and were expected to remain so until the winter months. Therefore, the inspectors did not have current operability concerns. The licensee entered the issue into their corrective action program as Condition Report 2004-06322.

The inspectors discussed the temperature issues with the system engineer. The engineer was aware of the deviations from the design temperature specifications but did not realize that he was required to write a condition report. Procedure 0.5 EVAL, "Preparation of Condition Reports," Revision 7, states, in part, that "Condition Reports (CRs) are prepared to address conditions adverse to quality . . ." Conditions adverse to quality include nonconforming conditions.

Analysis. The inspectors determined that the issue had more than minor safety significance because it impacted the mitigating systems cornerstone and could have affected the ability of safety-related components to perform their design basis functions. The licensee agreed to provide past operability evaluations for the affected equipment.

Enforcement. The finding remains unresolved pending receipt of the past operability evaluations, which are needed to complete the compliance evaluation and support a significance determination, URI 05000298/2004004-05, Failure to Identify Conditions Adverse to Quality.

Recommendation 5: Verify that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that the operators of this equipment will perform effectively

The inspectors determined that the licensee had established adequate programs to address this recommendation, but program implementation was sometimes inconsistent. For the programmatic aspects of the inspection, the inspectors reviewed a sample of the maintenance procedures for technical adequacy. The inspectors also reviewed the

service water system training program plans, procedures, and training records of maintenance and operations personnel involved with the work and operations of the service water system. The inspectors verified the proper alignment of valves and equipment material condition during a system walkdown. The inspectors observed that the licensee has had the following related issues in the past 3 years:

- Inadequate corrective actions following the identification that river temperature affected service water pump impeller clearances. Consequently, Pump D failed (NRC Inspection Report 50-298/2001-08).

- Failure to correct a condition adverse to quality, in that the licensee improperly bypassed the pump discharge strainer and introduced foreign debris into the system. The foreign material was not entirely removed and the pump later failed (NRC Inspection Report 50-298/2003-05).

- Inadequate system restoration, following maintenance, resulted in rendering the service water train and associated emergency diesel generator inoperable for 21 days (NRC Inspection Report 50-298/2001-08).

- Operators had failed to properly align a service water gland seal valve, which would have resulted in isolating gland seal to one service water pump under certain accident scenarios. The licensee performed testing and verified that the pump would have experienced significant operational problems. The resident inspectors continue to follow up on this issue.

No additional problems were found.

c. Effective Programmatic Maintenance of the Actions in Response to Generic Letter 89-13

Overall, the licensee effectively managed their commitment to their Generic Letter 89-13 program, but program implementation was sometimes inconsistent. The inspector checked program changes and verified that the licensee had notified the NRC of commitment changes, where necessary. In addition, as noted in item b, above, the licensee continued to properly implement their Generic Letter 89-13 program in all areas.

d. As applicable, Noteworthy Service Water System Operational History that Supports Inspection Results

The plant experienced the following service water related problems in the past 3 years:

- Service water minimum pipe wall thickness was below ASME allowables before the licensee performed repairs (NRC Inspection Report 50-298/2001-08).

- Inadequate corrective actions following the identification that river temperature affected service water pump impeller clearances. Consequently, Pump D failed (NRC Inspection Report 50-298/2001-08).

- Failure to properly analyze erosion and corrosion of the service water system (NRC Inspection Report 50-298/2001-08).

- Failure to properly analyze a coating that was applied to service water pipe riser columns (NRC Inspection Report 50-298/2002-02).

- Failure to correct a condition adverse to quality, in that the licensee improperly bypassed the pump discharge strainer and introduced foreign debris into the system. The foreign material was not entirely removed and the pump later failed (NRC Inspection Report 50-298/2003-05).

- Inadequate system restoration, following maintenance, resulted in rendering the service water train and associated emergency diesel generator inoperable for 21 days (NRC Inspection Report 50-298/2001-08).

- Operators had failed to properly align a service water gland seal valve, which would have resulted in isolating gland seal to one service water pump under certain accident scenarios. The licensee performed testing and verified that the pump would have experienced significant operational problems. The resident inspectors continue to follow up on this issue.

Historically, the licensee experienced some additional service water related problems. For example, in 1998, the licensee identified film fouling in the RHR heat exchangers. While not a specific item addressed by the Generic Letter, the licensee took corrective measures and established maintenance/inspection activities to ensure proper heat exchanger operation. In addition, in 1997, the licensee experienced a significant problem with silt accumulation in the RHR heat exchanger. The heat exchanger could no longer meet design requirements due to the silt accumulation (see Escalated Enforcement Action EA-97-424).

e. Effectiveness Assessment of Licensee's Program Procedure(s) on Related Service Water System Operating Experience

The inspectors reviewed the licensee's Operating Experience Program and associated procedures. The inspectors reviewed service water related condition reports to ensure that the licensee did not experience plant problems due to known issues already identified by industry operating experience and NRC generic communications. No problems were identified.

4OA6 Meetings, Including Exit

On September 16, 2004, the inspectors presented the results of the heat sink performance inspection Mr. K. Dahlberg, General Manager, Nuclear Support, and other members of licensee management who acknowledged the inspection findings.

On September 16, 2004, the inspector presented the results of the access controls to radiologically significant areas inspection to Mr. W. Macecevik, Acting Plant Manager, and other members of his staff who acknowledged the findings.

On September 24, 2004, the inspectors presented the results of the emergency preparedness inspection to Mr. S. Minahan, General Manager, Plant Operations, and other members of his staff who acknowledged the findings.

On October 7, 2004, the inspectors presented the inspection results of the resident inspector activities to Mr. S. Minahan, General Manager, Plant Operations, and other members of his staff who acknowledged the findings.

The inspectors confirmed that proprietary information was not reviewed during the inspection.

40A7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

- 10 CFR 1902(b) requires that “licensee’s shall post each high radiation area with a conspicuous sign or signs stating, “Caution, High Radiation Area.” On two occasions in March 2003, the licensee identified high radiation area postings that had been moved by plant personnel leaving the areas and were not re-posted. The finding was determined to be of very low safety significance because it was not an ALARA finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised. The licensee initiated Condition Reports CR 2003-0745 and CR 2003-0786 to address the issues.

- TS 5.4.1 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. Regulatory Guide 1.33, Section 7e, requires procedures for access control to radiation areas, including a radiation work permit system. Special Work Permit 20031028 required workers to contact radiation protection personnel prior to each entry and use a full set of protective clothing for entry into high contamination areas. On April 5, 2003, the licensee identified that contractors entered a posted high radiation area/high contamination area without contacting radiation protection personnel and that another crew of

contract workers exited the spent fuel pool gate area without proper protective clothing. The finding was found to have very low safety significance because it was not an ALARA finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Bednar, Emergency Preparedness Manager
C. Blair, Engineer, Licensing
M. Boyce, Corrective Action Program Senior Manager
D. Cook, Senior Manager of Emergency Preparedness
J. Christensen, Plant Manager
S. Minahan, Acting Nuclear Site Vice President
T. Chard, Radiological Manager
K. Chambliss, Operations Manager
T. Chard, Manager, Radiation Protection
K. Dalhberg, Senior Manager of Quality Assurance
J. Edom, Risk Management
R. Estrada, Performance Analysis Department Manager
M. Faulkner, Security Manager
J. Flaherty, Site Regulatory Liaison
P. Fleming, Risk and Regulatory Affairs Manager
C. Kirkland, Nuclear Information Technology Manager
D. Knox, Maintenance Manager
W. Macecevic, Work Control Manager
J. Roberts, Director, Nuclear Safety Assurance
L. Schilling, Administrative Services Department Manager
R. Shaw, Shift Manager
J. Sumpter, Senior Staff Engineer, Licensing
K. Tanner, Shift Supervisor, Radiation Protection

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000298/2004004-05	URI	Failure to Identify Conditions Adverse to Quality (Section 4OA5.2)

Opened and Closed

05000298/2004004-01	FIN	Inadequate Preventive Maintenance on Service Air Compressor A (Section 1R12)
05000298/2004004-02	NCV	Failure to Follow Temporary Shielding Procedure (1R15)
05000298/2004004-03	NCV	Failure to Perform an Adequate Survey (2OS1)

05000298/2004004-04	FIN	Inadequate Preventive Maintenance on Reactor Feed Pump Limit Switches (Section 4OA3.2)

Closed

50-298/2004-003	LER	High Pressure Coolant Injection Pump Inoperability Results in Loss of Safety Function (Section 4OA3.1)

LIST OF DOCUMENTS REVIEWED

Notifications

10103335	10268982	10308249	10308279
10103343	10289687	10308252	10308283
10104697	10289705	10308276	10302510
10110415	10290325	10311653	10318718
10115221	10296737	2004-06015	10318719
10115232	10296905	10318719	10326961
10198913	10297112	10322709	2004-06418
10230015	10297195	10334790	10308281
10230651	10297215	2004-06257	10308282
10265739	10297388	10308278	10322993
10267060	10299044	10311914	10322990
10268976			

Calculations

NEDC 91-103, “Cooling of the Diesel Generator Rooms Without HVAC Cooling Units,” Revision 1

NEDC 91-221, “Service Water Pump Room Temperatures After Loss of Cooling,” Revision 2

NEDC 91-239, “DGLO/DGJW/DG Intercooler Heat Exchanger Evaluation,” Revision 1

NEDC 94-021, “REC-HX-A & REC-HX-B Maximum Allowable Accident Case Fouling,” Revision 4

NEDC 96-029, “Post LOCA Service Water System Flow (considering) Variations with River Level,” Revision 3

NEDC 97-087, “Acceptance Criteria for HPCI Room Cooler and Reactor Building Quad Coolers,” Revision 3

Plant Modifications
CED 6005426, “Diesel Generator Cooling Requirements Upgrade,”
CED 6008700, “Service Water Pump Performance Improvements”

CED 6009401, “REC Flow switches for RHR Pump Coolers Deletion”
CED 6011141, “Removal of Microbiology Influenced Corrosion (MIC) Safe Harbor Sites from the Service Water System”

Procedures

Administrative Procedure 0.40, “Work Control Program,” Revision 17
Engineering Procedure 3.4, “Station Design Changes,” Revision 4
Maintenance Procedure 7.5.2, “MOV Testing and Data Analysis,” Revision 7
Procedure 5.7.1, “Emergency Classification,” Revision 31
Procedure 5.7.2, “Emergency Director EPIP,” Revision 21
Procedure 5.7.6, “Notification,” Revision 39
Procedure 5.7.7, “Activation of TSC,” Revision 29
Procedure 5.7.8, “Activation of OSC,” Revision 22
Procedure 5.7.14, “Stable Iodine Thyroid Blocking,” Revision 11
Procedure 5.7.20, “Protective Action Recommendations,” Revision 17
Procedure 5.7.27, “Alert and Notification System,” Revision 16
Position Instruction Manual, EOF1, “Emergency Director,” Revision 13
Procedure 0.5, “Conduct of the Condition Report Process,” Revision 48
Procedure 0.5CR, “Condition Report Initiation, Review, and Classification,” Revision 0
Procedure 0.5EVAL, “Preparations of Condition Reports,” Revision 7
Procedure 2.2.65.1, “REC Operations,” Revision 41
Procedure 2.2.69, “Residual Heat Removal System,” Revision 72
Procedure 2.2.71, “Service Water System,” Revision 74
Procedure 3.10, “Erosion/Corrosion Program,” Revision 10
Procedure 3.30, “Macroscopic Biological Fouling Organism Sampling,” Revision 3
Procedure 3.34, “Heat Exchanger Program,” Revision 6
Procedure 5.2SW, “Service Water Casualties,” Revision 10
Procedure 5.2REC, “Loss of REC,” Revision 4
Procedure 6.1HV.602, “Air Flow Test of Val Coil Unit HV-DG-1C (Div I),” Revision 4
Procedure 6.SW.102, “Service Water system Post-LOCA Flow Verification,” Revision 12
Procedure 6.1SW.101, “Service Water Surveillance Operation (DIV 1) (IST),” Revision 18
Procedure 7.0.14, “Predictive Maintenance Program,” Revision 4
Procedure 7.2.14, “RHR SWBP Overhaul and Replacement,” Revision 29
Procedure 7.2.42, “Heat Exchanger Cleaning,” Revision 19
Procedure 7.2.42.1, “REC Heat Exchanger Maintenance,” Revision 3
Procedure 7.2.42.2, “RHR Heat Exchanger Maintenance,” Revision 2
Procedure 10.18, “DGJW Heat Exchanger Performance,” Revision 0
Procedure 13.17, “Residual Heat Removal Heat Exchanger Performance Testing,” Revision 18
Procedure 103M, “Mechanical Maintenance Personnel,” Revision 1
Procedure O-EBS-NOT, “SAP Notifications,” Revision 16

Section 2OS1: Access Controls to Radiologically Significant Areas (71121.01)

Special Work Permits

20031024	Undervessel Activities in the Drywell
20031033	ISI/EC Activities in Drywell
20031036	Target Rocks & Associated Tasks
20041050	R-903'-Steam Tunnel-Fan Coil Unit “B” Repair
20041057	Drywell-General Access/Limited Maintenance

Procedures

9.RADOP.1	Radiation Protection at CNS, Revision 4
9.RADOP.2	Radiation Safety Standards and Limits, Revision 6
9.RADOP.3	Area Posting and Access Control, Revision 15

Condition Reports/Notifications

2003-0638, 2003-0740, 2003-0745, 2003-0750, 2003-0786, 2003-0852, 2003-1309, 2003-1955, 2004-0241, 10239351, 10268909, 10256460, 10256460, 10249334, and 10307123

Self-Assessments/Audits/Field Observations

QAD 20030025, QAD 20030028, QAD 20030034, QAD 20030051, QAD 200400044, SA 03009, and SS 04042

LIST OF ACRONYMS

ALARA	as low as is reasonably achievable
CFR	*Code of Federal Regulations*
FIN	finding
HPCI	high pressure coolant injection
LER	licensee event report
NCV	noncited violation
NRC	U.S. Nuclear Regulatory Commission
PI	performance indicator
RCIC	reactor core isolation cooling
RHR	residual heat removal
TS	Technical Specification