



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

July 23, 2004

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Nebraska Public Power District
P.O. Box 98
Brownville, NE 68321

**SUBJECT: COOPER NUCLEAR STATION - NRC INTEGRATED INSPECTION
REPORT 05000298/2004003**

Dear Mr. Edington:

On June 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 July 1, 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 five findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC also determined that there were four 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 the violation or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the 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
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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: 05000298/2004003
Licensee: Nebraska Public Power District
Facility: Cooper Nuclear Station
Location: P.O. Box 98
Brownville, Nebraska
Dates: March 25 through June 23, 2004
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SUMMARY OF FINDINGS

IR05000298/2004003; 03/25/04 - 06/23/04; Cooper Nuclear Station; Equipment Alignment, Personnel Performance During Nonroutine Evolutions, Operability Evaluations, Identification & Resolution of Problems, & Event Followup.

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

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to correct a condition adverse to quality regarding inadvertent actuations of safety-related relays. In May 2004, an additional inadvertent relay actuation during a maintenance activity caused Service Water Pump B to trip.

This finding was more than minor since it affected the availability and reliability of an operating service water pump, but it was considered to have very low safety significance since it did not represent the loss of a safety function. This finding also had crosscutting aspects associated with problem identification and resolution based on the fact that the condition was entered into the corrective action program but no corrective actions were ever implemented (Section 1R04.3).

- Green. The inspectors identified a noncited violation of Technical Specification 5.4.1(a) for the failure to follow the operability determination procedure. Operators placed the diesel fuel oil system in an abnormal configuration as a compensatory measure for a degraded condition on the fuel oil storage tank cross-connect valves. This configuration was not evaluated as required by the operability determination procedure.

This finding was more than minor since it was associated with the operability of mitigating equipment and could become more significant if left uncorrected. It was considered to have very low safety significance because it did not represent the loss of a safety function. It also had cross-cutting aspects associated with problem identification and resolution since the degraded condition was well-documented in the corrective action program but did not receive the appropriate evaluations (Section 1R15).

- Green. The inspector identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to take adequate corrective actions for degraded conditions on the diesel fuel oil transfer system. On March 23, 2004, the

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inlet strainer on Fuel Oil Day Tank 1 became clogged with corrosion debris, rendering Emergency Diesel Generator 1 inoperable. This was the third occurrence of this event in 13 months.

This finding was more than minor since it affected the operability, availability, and reliability of a mitigating system. It was considered to have very low safety significance based on the results of a Significance Determination Process, Phase 3, evaluation. This finding also had crosscutting aspects associated with problem identification and resolution based on the recurring nature of the failure and the fact that the licensee's corrective actions only addressed symptoms of the failure and not the root cause (Section 4OA2.3).

Cornerstone: Barrier Integrity

- Green. A self-revealing violation of Technical Specification 5.4.1(a) occurred when personnel failed to implement a tagout correctly and opened the wrong breaker, resulting in an inadvertent partial isolation of containment.

This finding was more than minor since it was similar to Example 4.b in Manual Chapter 0612, Appendix E. It was considered to have very low safety significance since it did not represent an actual barrier degradation or an open path in the reactor containment. This finding also had crosscutting aspects associated with human performance since personnel did not use the appropriate error prevention tools while implementing the tagout (Section 1R14.1).

Cornerstone: Initiating Events

- Green. A self-revealing finding was identified associated with the licensee's failure to perform adequate maintenance on Reactor Recirculation Motor Generator A. Inadequate maintenance on the motor generator field brushes resulted in the loss of field voltage, an unexpected trip of the motor generator, and an unplanned reduction in reactor power. The licensee failed to change their preventive maintenance requirements to incorporate vendor recommendations following modification of the brushes.

This finding was more than minor since it affected the Reactor Safety Initiating Events cornerstone attribute of design control and resulted in a plant transient. It was considered to be of very low safety significance since it did not contribute to the likelihood of a loss-of-coolant accident, did not contribute to the loss of mitigation equipment, and did not increase the likelihood of a fire or flooding event (Section 4OA3.1).

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

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have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers 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 April 17, reactor power was reduced to 60 percent for planned maintenance for approximately 14 hours. On May 2, Reactor Feed Pump B unexpectedly decreased in speed, which caused a reactor power reduction to 70 percent. Full power operation resumed on May 6 following repairs. On June 5, reactor power was reduced to 45 percent for emergent repairs to Steam Tunnel Fan Cooler Unit B. Full power operation was resumed approximately 18 hours later.

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 Emergency Diesel Generator (EDG) 1 to determine if ventilation was aligned for warm weather per procedures
- A walkdown of the ventilation screens in the intake structure to verify that the licensee had completed the required actions identified in the work orders

The two systems chosen for this inspection included:

- Portions of the EDG 1 system
- The intake structure and environmental controls in the service water pump room

b. Findings

No findings of significance were identified.

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1R04 Equipment Alignment

.1 Partial Equipment Alignment Inspections

a. Inspection Scope

The inspectors performed four partial equipment alignment inspections (four 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:

- EDG 1 while EDG 2 was out of service for planned maintenance on April 13. The walkdown included portions of the system in the diesel room and the control room.
- EDG 2 while EDG 1 was out of service for planned maintenance on April 20. The walkdown included portions of the system in the diesel room and the control room.
- Residual Heat Removal (RHR) system Loop A while Loop B was out of service for planned maintenance on April 26. The walkdown included portions of the control room, Elevation 859 in the reactor building, and RHR A Heat Exchanger Room.
- RHR system Loop B while Loop A was out of service for planned maintenance on May 19. The walkdown included portions of the control room, Elevation 859 in the reactor building, and the RHR B Heat Exchanger Room.

a. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

On May 20, the inspectors performed one complete system alignment inspection of Service Water (SW) System Loop B. 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 actions 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.

.3 Identification and Resolution of Problems - Inadvertent Trip of SW Pump B

a. Inspection Scope

The inspectors followed up on an event that occurred on May 12, 2004, during which SW Pump B inadvertently tripped while restoring RHR Pump D following planned maintenance. This inspection included a review of historical problems with General Electric HFA and HGA relays used in the critical switchgear cabinets and a review of the licensee's apparent cause investigation.

b. Findings

Introduction. A Green, noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, was identified for the failure to correct a condition adverse to quality regarding undervoltage relays on the critical buses.

Description. On May 12, 2004, while personnel were restoring RHR Pump D following planned maintenance, SW Pump B was inadvertently tripped. Following installation of the control power fuses for the RHR pump breaker, personnel experienced difficulty latching the relay cabinet door due to misalignment in the door and additional force was applied to the door in an attempt to latch it. The additional force agitated one of the 4160 V Bus 1G undervoltage relays (Relay 27X1-1G or 27XX-1G) installed in the cabinet door, causing a momentary actuation. This resulted in SW Pump B tripping and SW Pump D automatically starting. In addition, the SW cross-tie valve automatically isolated as expected when pressure in the SW Loop B header decreased during the event. Control room operators entered the appropriate abnormal and emergency procedures for the loss of an SW pump and were able to stabilize system parameters.

The licensee concluded that this event resulted from a latent equipment issue, that is, the misalignment of the cabinet door. The licensee concluded that the misalignment of the cabinet door was unknown by the operators since the door was infrequently operated and there was no deficiency tag present to indicate a problem. While there was not a deficiency tag on the cabinet door, the inspectors noted that there was a sign on the cubicle door cautioning personnel to "CLOSE DOOR GENTLY: JARRING **WILL** CAUSE U.V. [undervoltage] RELAY OPERATION."

The inspectors conducted an independent review of the corrective action program to determine if any trends existed regarding similar relay actuations. This review yielded the following results:

- On June 24, 2002, Relay 1GS30 was "bumped" while installing fuses for Breaker 1GS, resulting in an alarm in the control room. This occurrence was documented in Notification 10173427. The notification was written for trending purposes only and did not result in any corrective actions.

- On October 17, 2002, a “Service Water Pump B Trip” alarm was received in the control room while installing breaker control power fuses for SW Pump B. The most likely cause was determined to be agitation of the undervoltage relay associated with Bus 1G. This occurrence was documented in Notification 10201624. The notification was written for trending purposes only and did not result in any corrective actions.
- On December 9, 2002, Relay 1GS30 was “bumped” while installing fuses for Breaker 1GS, resulting in an alarm in the control room. This occurrence was documented in Notification 10213098. Work Order 4253967 was initiated to further investigate the cause of this occurrence; however, it was canceled with no additional action taken.
- On March 8, 2004, Relay 27X-1FA2 cycled while opening the relay cabinet door, resulting in an undervoltage alarm in the control room. This occurrence was documented in Notification 10299783. No corrective actions were specified; this occurrence was trended only.

These four occurrences involved General Electric HFA or HGA relays installed in breaker relay cabinet doors. While none of these resulted in an equipment actuation, the inspectors concluded that they were similar in nature to the relay actuation on May 12, 2004, and it would have been reasonable to expect the licensee to have taken corrective actions to prevent inadvertent actuations of safety-related relays during maintenance activities.

Analysis: The failure to take corrective actions for inadvertent relay actuations associated with safety-related switchgear relays was considered a performance deficiency. This finding affected the Mitigating Systems Cornerstone and was considered more than minor, since it affected the availability and reliability of an operating service water pump. Based on the results of a Significance Determination Process, Phase 1, evaluation, the finding was determined to have very low safety significance since it did not represent an actual loss of safety function.

This finding also had crosscutting aspects associated with problem identification and resolution. This assessment was based on the fact that at least four condition reports were written over the past 2 years to document similar relay actuations during maintenance activities, yet no corrective actions were implemented.

Enforcement: Appendix B, Criterion XVI, 10 CFR Part 50, states that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to this requirement, the licensee had determined that mechanical agitation of the safety-related switchgear cabinet doors could cause actuation of the relays, yet no corrective actions were implemented to prevent this from adversely impacting mitigation equipment. This resulted in the inadvertent trip of SW Pump B while closing one of the relay cabinet doors on May 12, 2004. This violation of 10 CFR Part 50, Appendix B, Criterion XVI, is being treated as a noncited violation, consistent

with Section VI.A of the NRC Enforcement Policy (NCV 05000298/2004003-01). The licensee entered this issue into their corrective action program as Resolve Condition Report (RCR) 2004-0356.

1R05 Fire Protection

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, Service Water Pump Room on April 12
- Fire Zone 2A, Reactor Building 903 on May 5
- Fire Zone 3A/B, Switchgear Rooms 1F and 1G on May 19
- Fire Zone 14A, EDG 1Room on May 19
- Fire Zone 10B, Control Room and SAS Corridor on June 2
- Fire Zone 1E, High Pressure Core Injection (HPCI) on June 2

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors performed the annual external flood protection inspection (one sample). The inspection included a walkdown of flood protection barriers and a review procedures for coping with external flooding. In addition, the inspectors reviewed RCR 2002-0794, which contained the licensee's evaluation of NRC Information Notice 2002-12, "Submerged Safety Related Electrical Cables." This review was to verify that assumptions made regarding cable vault flooding remained valid.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed one session of licensed operator requalification training in the plant simulator on June 7 (one inspection sample). The training evaluated the operators' ability to recognize, diagnose, and respond to a loss of reactor recirculation pumps leading to a major plant transient and reactor vessel stratification. 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:

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- Reactor Feed Pump B controller failure on November 28, 2003 (Significant Condition Report (SCR) 2003-1930)
- Water in the Service Water Booster Pump D inboard bearing oil housing on February 6 (Notification 10294329)
- Reactor Recirculation Motor Generator (RRMG) A brush failure on February 14, 2004 (SCR 2004-0115).

b. Findings

No findings of significance were identified

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:

- Elective maintenance on Isolated Phase Bus Duct Fan A on April 12 (Work Order 4331942)
- Corrective maintenance on EDG 2 to perform inspection of connecting rods on April 13 (Work Order 4364045)
- Corrective maintenance on the high pressure coolant injection system due to an exhaust drain pot level switch failure on June 1 (Work Order 4382548)
- Corrective maintenance on Steam Tunnel Fan Coil Unit B to replace shaft bearings on June 5 (Work Order 7383411)
- Corrective maintenance on Core Spray System Loop B to replace switch CS-SW-S7B while the 161 kV offsite power system was unavailable on June 8 (Work Order 4336074)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Evolutions

.1 Nonroutine Evolutions

a. Inspection Scope

For the two 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 March 9, the inspectors responded to the control room following an unanticipated primary containment isolation actuation. The inspectors verified that systems responded as designed and that operators took appropriate actions to stabilize plant conditions. The inspectors also observed the licensee's troubleshooting activities, which verified that the isolation signal was caused by a loss of power to a portion of the primary containment isolation logic circuitry.
- On May 24, the inspectors responded to the control room and observed site response to a tornado warning issued for Nemaha County, Nebraska. The inspectors verified that operator response was in accordance with station procedures and monitored plant conditions during the warning.

b. Findings

Introduction. A Green, self-revealing, noncited violation occurred when a nonlicensed equipment operator failed to follow the tag-out procedure and inadvertently opened the incorrect breaker, which resulted in a partial actuation of the primary containment isolation system.

Details. On March 9, at approximately 12:42 p.m., the plant experienced a Group 6 and a partial Group 2 primary containment isolation. This caused an isolation of the reactor building normal ventilation systems and the auto-initiation of the standby gas treatment system as well as isolation of the RRMG ventilation system. Operators verified that there was not a valid condition which would require these isolations, so they reset the isolation signal and restored equipment to its normal state. Immediate troubleshooting activities indicated that power had been momentarily interrupted to a portion of Group 6 isolation logic which resulted in the isolation signals.

Coincident with the isolations, the licensee was in the process of implementing Clearance Order PC-1-4367147 to support corrective maintenance on the Division 2 hydrogen analyzer. This clearance order required Breaker 18 on Power Panel CCP-1B to be opened; Breaker 16, located directly below Breaker 18, supplies power to the Group 6 isolation logic circuitry. The clearance order had been assigned to a nonlicensed equipment operator who, according to security records, was the only

individual in the area of Power Panel CCP-1B during this time. After an extensive investigation, the licensee concluded that the operator inadvertently opened Breaker 16 rather than Breaker 18 and then immediately reclosed the breaker.

The licensee's root cause investigation concluded that the prejob brief for implementing Clearance Order PC-1-4367147 was inadequate in that it did not address the use of peer checking or consider the impact of potential errors during the activity. The investigation also concluded that the operator did not use the appropriate human performance tools designed to prevent errors.

Analysis. The inspectors concluded that operating the wrong breaker and causing engineered safety features to actuate was a performance deficiency. This finding affected the Barrier Integrity Cornerstone and was more than minor since it was sufficiently similar to Example 4.b in Manual Chapter (MC) 0612, Appendix E. Based on the results of a Significance Determination Process, Phase 1, evaluation, this finding was determined to have very low significance since it did not represent a barrier degradation for the control room envelope, auxiliary building, spent fuel pool, or standby gas treatment system, and did not represent an actual open pathway in the reactor containment.

This finding also had crosscutting aspects associated with human performance. This assessment was based on the findings in the licensee's root cause analysis which determined that the event was caused, in part, by the inappropriate use of human performance tools.

Enforcement. TS 5.4.1(a) requires written procedures to be implemented as recommended by Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for equipment control. Clearance Order PC-1-4367147, as implemented by Administrative Procedure 0.9, "Tagout," Revision 38, required Breaker 18 on CCP-1B to be opened. Contrary to this, Breaker 16 on CCP-1B was opened, which caused an engineered safety features actuation. This violation is being treated as a noncited violation (NCV 05000298/2004003-02), consistent with Section VI.A of the NRC Enforcement Policy. The licensee entered this finding into their corrective action program as SCR 2004-0163.

.2 Licensee Event Report (LER) Involving Operator Error

a. Inspection Scope

For LER 50-298/2004-002 (Failure to Follow Procedure Results in Both Diesel Generators Being Inoperable) 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 (one inspection sample):

- On March 23, the EDG 1 fuel oil day tank inlet strainer became fouled, causing EDG 1 to be inoperable. As an interim compensatory action to demonstrate EDG 2 operability, operators opened EDG fuel oil storage tank cross-tie Valves DGDO-V-22 and -23 on March 24. On March 28, DGDO-V-23 was discovered closed, resulting in both EDG's being inoperable. Additional aspects of the EDG strainer fouling are described in Section 4OA2.

b. Findings

Introduction. A Green, licensee identified noncited violation of T.S. 5.4.1(a) was identified regarding the failure of personnel to follow procedures for equipment control.

Description. On March 23, EDG 1 was declared inoperable due to corrosion product debris blocking the fuel oil day tank inlet strainer (refer to Section 4OA2.2 for further discussion of this condition). In accordance with TS 3.8.1, the licensee performed an operability determination for EDG 2 (Notification 10302980), which concluded that the two fuel oil storage tank cross-connect valves (DGDO-V-22 and -23) needed to be opened in order to demonstrate operability of EDG 2. Two nonlicensed equipment operators were dispatched to caution tag these valves in the open position. During normal operator rounds on March 28, a station operator questioned a 6-inch level difference between the two diesel fuel oil storage tanks and determined that DGDO-V-23 was actually closed. The control room operators subsequently declared EDG 2 inoperable, which required entry into a 2-hour TS action statement since EDG 1 was still inoperable at the time. DGDO-V-23 was immediately opened, restoring EDG 2 to operable status.

Cooper Nuclear Station was designed and licensed with two 30,000 gallon diesel fuel oil storage tanks, two transfer pumps, and a day tank for each EDG. A single storage tank does not have sufficient capacity to supply a fully loaded EDG for 7 days; therefore, during implementation of Emergency Procedure 5.3EMPWR, "Emergency Power," Revision 9, one EDG is secured and the two cross-connect valves are opened in order to provide the remaining EDG with a 7-day fuel supply. According to System Operating Procedure 2.2.12A, "Diesel Fuel Oil Transfer System Valve Checklist," Revision 10, the normal position of these two valves is closed in order to satisfy seismic qualification and single failure criteria as described in the Updated Safety Analysis Report. DGDO-V-22 and -23 are manually operated ball valves arranged in series and buried 12 feet below ground next to the fuel oil storage tanks. Each valve has a reach-rod with boss-marks to indicate the valve's position.

The licensee's root cause investigation determined that the nonlicensed operators assigned to open DGDO-V-23 failed to follow Administrative Procedure 0.31, "Equipment Status Control," Revision 21, for the operation of DGDO-V-23. Administrative Procedure 0.31 directed operators to open the valve to just off the backseat and to verify the valve open by operating the valve in the closed direction as necessary to verify movement. However, the operator assigned to open DGDO-V-23 concluded that the valve was already open using a system drawing and the valve boss-

mark; he did not physically operate the valve as required. The boss-mark did not accurately reflect the valve position. Additionally, a second operator who was assigned to independently verify the position of the valve did not physically operate the valve as required for independent verification. The licensee's root cause team noted that the second operator also failed to maintain independence, since the operator assisted the first operator in determining the position of DGDO-V-23.

Analysis. The failure to follow station procedures was considered a performance deficiency which affected the Mitigating Systems Cornerstone, since it was associated with the operability of mitigating equipment. This finding was considered more than minor, since it affected the Mitigating Systems Cornerstone attribute of operability, availability, and reliability of a mitigating system. Based on the results of a Significance Determination Process, Phase 1, evaluation, this finding was determined to have very low safety significance since EDG 2 was inoperable but functional and there was not an actual loss of the emergency power safety function.

This finding also had crosscutting aspects associated with human performance. This assessment was based on the fact that the two operators assigned to open DGDO-V-23 failed to use appropriate human error prevention tools and procedural methods for operation of the valves.

Enforcement

TS 5.4.1 (a) requires written procedures to be implemented as recommended by RG 1.22, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for equipment control. Administrative Procedure, "Equipment Status Control," Revision 21, directed the licensee to open the valve to just off the backseat and to operate the valve in the closed direction as necessary to verify the valve is open. Contrary to this requirement, on April 24, 2004, operators failed to open the diesel fuel oil storage tank cross-connect valves and failed to verify the valves open. The licensee entered this finding into their corrective action program as SCR 2004-0229. This violation was identified by the licensee and meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a noncited violation.

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, TS, and the associated system design criteria documents to determine if operability was justified.

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The inspectors reviewed the following equipment conditions and associated operability evaluations:

- SW Pump C 4160 V breaker prop spring stop bracket loose (Notification 10300802)
- Degraded conditions on Diesel Fuel Oil Storage Tank 1 (Notification 10302980)
- Degraded conditions on diesel fuel oil storage tank cross-connect valves (DGDO-V-22 and -23) (Notification 10308705)
- SW Zurn Strainer A controller wiring deficiency (Notification 10308336)

b. Findings

Introduction. A Green, noncited violation of TS 5.4.1(a) was identified regarding the failure to follow procedures for evaluating degraded conditions associated with the diesel fuel oil transfer system and the failure to adequately evaluate compensatory actions taken for those degraded conditions.

Description. During the root cause investigation for SCR 2004-0229, regarding a misalignment issue with DGDO-V-22 and -23 described in Section 1R14.2, the root cause team identified that these valves had a history of difficult operation. In order to resolve this issue, the licensee measured the torque required to operate the valves and found that DGDO-V-23 required 100 ft-lbs to open and DGDO-V-22 could not be opened even with 225 ft-lbs of torque applied to it. According to the vendor manual, the valves should have operated with approximately 50 ft-lbs of torque. The licensee documented this condition on April 16 in Notification 10308705, which was flagged as an equipment issue that required control room review. This review stated that the valves provided a pressure boundary only, and there was no operability concern since the valves were closed. The review was incomplete in that it did not address the requirement to open the valves during implementation of emergency procedures. Four days later, after further review, the licensee identified this error and initiated Notification 10309260 to document the inadequate operability determination. Rather than perform an operability determination at that time in order to resolve this issue, the on-shift crew applied the necessary torque to open both valves and caution-tagged both valves in the open position. Caution Order DGDO-1-DGDO-22/23 provided direction to maintain the valves open until repairs could be completed under Work Order 4160542, which was scheduled to be completed in 8 months during the next refueling outage.

The inspectors concluded that the excessive torque required to operate the cross-connect valves constituted a degraded condition since the valves functioned both as isolation valves to meet single failure criteria as well as cross-connect valves which were required to be open during emergency procedures. Therefore, an operability determination should have been performed in accordance with Administrative Procedure ENN-OP-104, "Operability Determinations," Revision 2. Furthermore,

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changing the configuration of the system by repositioning both valves to open should have been considered a compensatory measure in response to a degraded condition, which would have required evaluation using Administrative Procedure 0.8, "10CFR50.59 Reviews," Revision 12. Neither of these activities was performed.

As an immediate corrective action, the licensee performed the necessary evaluations to demonstrate the acceptability of aligning the system so that DGDO-V-22 was open and DGDO-V-23 was closed. In addition, the licensee reopened Notification 10309260 to investigate the apparent cause regarding the failure to perform an operability determination for these valves.

Analysis. The failure to follow station procedures regarding operability determinations and configuration control of equipment was considered a performance deficiency which affected the Mitigating Systems Cornerstone. This finding was more than minor, since it was associated with the operability of mitigating equipment, and the failure to follow the station's operability determination procedure could become a more significant safety concern if left uncorrected. Based on the results of a Significance Determination Process, Phase 1, evaluation, this finding was determined to have very low safety significance, since there was not an actual loss of the emergency power safety function.

This finding also had crosscutting aspects associated with problem identification and resolution. This assessment was based on the fact that the degraded condition on DGDO-V-22 and -23 was entered into the corrective action program on two separate occasions and neither notification resulted in an operability determination as required by Administrative Procedure ENN-OP-104, "Operability Determinations," Revision 2. Furthermore, performance deficiencies in conducting operability determinations is a recurring problem which has yet to be resolved by corrective actions.

Enforcement. TS 5.4.1(a) requires written procedures to be implemented as recommended by RG 1.22, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for equipment control. Administrative Procedure ENN-OP-104, "Operability Determinations," Revision 2, required the licensee to evaluate compensatory measures for degraded conditions using Administrative Procedure 0.8, "10CFR50.59 Reviews," Revision 12. Contrary to this requirement, on April 20, 2004, operators issued a long-term caution order to open the diesel fuel oil storage tank cross-connect valves without performing this evaluation. This violation is being treated as a noncited violation (NCV 05000298/2004003-03), consistent with Section VI.A of the NRC Enforcement Policy. The licensee entered this finding into their corrective action program as Notification 10309260.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors performed a review of all open operator workaround items (one inspection sample) to evaluate their cumulative 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.

1R17 Permanent Plant Modifications

.1 Annual Review

a. Inspection Scope

SW Zurn Strainer Controller Modification

The inspectors reviewed plant modification CED 6012680, which installed a fuse to isolate safety-related components from nonsafety components inside the SW Zurn strainer controller. The inspectors' review included the licensee's evaluation to determine if the modification represented an unreviewed safety question.

b. Findings

No findings of significance were identified.

.2 Biennial Review

a. Inspection Scope

The inspectors reviewed 17 permanent plant modification packages and associated documentation (e.g., implementation reviews, safety evaluation applicability determinations, and screenings) to verify that they were performed in accordance with regulatory requirements and plant procedures. The inspectors reviewed procedures governing plant modifications to evaluate the effectiveness of the programs for implementing modifications to risk-significant systems, structures, and components, such that these changes did not adversely affect the design and licensing basis of the facility. Procedures and permanent plant modifications reviewed are listed in the attachment to this report. The inspectors interviewed the cognizant design and system engineers for the identified modifications to gain their understanding of the modification packages.

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:

- K14C relay replacement on April 8 (Work Order 4370504)
- EDG 2 fuel oil strainer cleaning and inspection on April 14 (Work Order 4371502)
- EDG 1 fuel oil strainer cleaning and inspection on April 21 (Work Order 4371442)
- SW Zurn strainer cleaning and inspection May 14 (Work Order 4334745)
- 4160 V Breaker 1FA inspection on June 2 (Work Order 4336995)

b. Findings

No findings of significance were identified

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the following five surveillance tests (five 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 Technical Specification requirements, the Updated Safety Analysis Report, and licensee procedural requirements:

- 6.HPCI.103, "HPCI IST [inservice test] and 92 Day Test Mode Surveillance Operation," Revision 25, performed on April 27
- 6.LPRM.301, "LPRM [local power range monitor] Calibration Adjustments," Revision 10, performed on April 28
- 6.1RHR.305, "RHR Loop A Pump Low Flow Switch Channel Calibration (DIV 1)," Revision 6, performed on May 24

- 6.HV.104, "Control Room Emergency Fan Charcoal and HEPA [high efficiency particulate air] Filter Leak Test, Fan Capacity Test, and Charcoal Sampling," Revision 10, performed on June 3
- 6.2SW.101, "Service Water Surveillance Operation (Division 2) (IST)," Revision 18, performed on June 10

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary plant modification (one inspection sample), Work Order 4373288, implemented on April 6, which installed a clamp and strongback to support injecting leak sealant into the Reactor Feed Pump A check valve (RF-CV-10CV) for leak repairs. The inspectors verified that the change did not require NRC approval prior to implementation and adequate controls on the installation existed.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector performed an in-office review of Revision 46 to the Cooper Nuclear Station Emergency Plan, submitted May 10, 2003. This revision: (1) updated management titles, (2) clarified the description of quality assurance audits, and (3) corrected editorial errors. This revision was compared to its previous revision and to the requirements of 10 CFR 50.47(b) and 50.54(q) to determine if the revision decreased the effectiveness of the emergency plan.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors sampled three licensee performance indicators (PI) listed below for the period April 1, 2003, through April 31, 2004. 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 PI data during the assessment period. Licensee PI data were reviewed against the requirements of Procedure 0-PI-01, "Performance Indicator Program," Revision 14.

Reactor Safety Strategic Area

- Safety system unavailability for high pressure safety injection
- Safety system unavailability for the residual heat removal system
- Safety system unavailability for emergency AC power

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.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Semiannual Trend Review

a. Inspection Scope

The inspectors performed a semiannual assessment of trends in the licensee's corrective action program to determine if any more significant safety issues existed. Specifically, the inspectors reviewed the licensee's corrective action program database to determine if the licensee had identified trends in any of the following areas:

- Reactor feed pump controller alarms
- Reactor chemistry sample results
- Security equipment malfunctions
- Security search results
- Average power range monitor alarms
- Ronan computer multiplexer failures
- Relay failures
- Breaker failures

- Tagout errors
- Procedure adherence
- Operability determinations
- Reactor building ventilation

These areas were chosen based on information gathered by the inspectors during the previous 6 months. For those areas where trends were documented in the corrective action program, the inspectors verified that the licensee had corrective actions planned or in place to address the trend. For the remainder of the issues in the scope of this inspection, the inspectors reviewed control room logs, system health reports, Quality Assurance Audits, and department self-assessments and interviewed selected licensee staff to determine if any adverse trends existed.

b. Findings

The inspectors concluded that, in general, the licensee had adequately identified trends in areas within the scope of this inspection however, these trends were not always explicitly documented in the corrective action program. This was a result of the licensee's practice of closing new condition reports regarding similar equipment issues to an existing condition report which was already open to evaluate the condition. For example, there were at least seven condition reports written over the past 12 months documenting elevated sulfate levels in the reactor coolant; the majority of these were classified as trend only since this was a well known problem and a mitigation strategy was being formulated. This was identified as an adverse trend in the chemistry department's ongoing quarterly self-assessment and listed as one of the station's top ten technical issues, but there was no contemporary condition report to document a continuing trend with this chemistry parameter. The inspectors made similar observations with other repetitive equipment issues. In all cases, the licensee was taking adequate corrective actions to address the trends.

There were eight condition reports written during this 6-month period regarding 4160 V Magne-Blast breakers, which was an insufficient number to cross any statistical thresholds in the licensee's trending program. The inspectors did not identify any common themes among these condition reports that would constitute a trend, with the exception of two condition reports written to document damage to breaker secondary disconnects due to breaker misalignment. During a discussion of these events, engineering personnel recalled that additional similar events had occurred prior to 2004 and concluded that a trend may exist. Notification 10322874 was written to document a potential trend regarding damage to secondary disconnects due to misalignment.

.2 Control of Plant Modifications

a. Inspection Scope

The inspectors reviewed 12 notifications written in response to errors identified in calculations. The inspectors identified that 8 of the 12 notifications documented errors in calculations that indicated a potential adverse trend in human performance and attention to detail.

b. Findings

The inspectors determined that the failure to identify a potential adverse trend was a minor finding. None of the errors identified, either individually or collectively, would have adversely affected plant equipment. While licensee personnel were identifying individual errors, the licensee failed to identify a potential adverse trend with respect to errors in calculations. Quality Assurance personnel last performed an audit of calculation accuracy in the year 2000. While not specifically addressed by the licensee's audit program, the inspectors found that there were no other inspections of calculation accuracy scheduled. The inspectors noted that the licensee was missing an opportunity to identify potential adverse trends in calculations in a timely manner by not auditing the accuracy of calculations on a more frequent basis. Licensee management stated that calculation accuracy would be addressed as a specific item in an upcoming engineering audit. The licensee entered this issue in corrective action program as Notification 10305273.

.3 EDG 1 Inoperable Due to Debris Buildup on the Inlet Strainer for Fuel Oil Day Tank

a. Inspection Scope

The inspectors performed a review of SCR 2004-0209, which documented the root cause investigation into the EDG 1 fuel oil day tank strainer fouling. The inspectors also conducted interviews with selected licensee engineers and the personnel who conducted the investigation. Other aspects of this event are discussed in Sections 1R14.2 and 4OA3.2 of this report

b. Findings

Introduction: A Green self-revealing, noncited violation was identified regarding the failure to take adequate corrective actions for degraded conditions on the diesel fuel oil transfer system.

Description: On March 23, while conducting a monthly surveillance run on EDG 1, the control room received a low level alarm in the EDG 1 fuel oil day tank. Troubleshooting indicated that the fuel oil strainer on the inlet float valve for Fuel Oil Day Tank 1 had accumulated sufficient corrosion product debris from the fuel stream as to restrict flow. The licensee subsequently declared EDG 1 inoperable.

Two similar fouling events occurred in February and November 2003. During these two events, Fuel Oil Transfer Pump A failed to develop the required flow rate during Surveillance Procedure 6.1DG.401, "Diesel Generator Fuel Oil Transfer Pump IST Flow Test (Division 1)," Revision 13. Following each event, troubleshooting indicated that the fuel oil strainer on the inlet float valve for Fuel Oil Day Tank 1 had become clogged with debris. As discussed in NRC Integrated Inspection Report 05000298/2003007, an operability determination was performed following the February 2003 fouling event which concluded that corrosion products were being transported from the fuel oil storage tank to the strainer and that this was a slow process which could be managed through the preventive maintenance (PM) program. The frequency of the PM to clean and inspect the strainer was increased from 72 weeks to 24 weeks. This corrective action only addressed the symptoms of this adverse condition (transport of corrosion products from the storage tank), not the root cause (the fact that the storage tank was corroding) and was inadequate as evidenced by the fact that the condition recurred in November 2003. This was determined to be a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI (NCV 05000298/2003007-02).

Following the November 2003 fouling event, the licensee again concluded that the failure mechanism was a slow buildup of corrosion products in the fuel oil strainer which could be managed, and the PM to clean and inspect the strainer was increased to a monthly frequency. In addition, the licensee planned to drain, clean, inspect, and apply a protective coating inside the tanks during the January 2005 refueling outage. However, on March 23, 2004, EDG 1 had only run for approximately 5 hours before the strainer clogged. This invalidated the technical basis for the previous operability determination which stated that the strainer debris buildup occurred over several months and was not the result of sudden buildup. This also indicated that the corrective actions for the November event were inadequate as they only addressed the symptoms of the adverse condition, not the root cause.

After the March 2004 failure, the licensee installed a duplex fuel strainer in place of the fuel oil strainer on the inlet float valve. The duplex strainer has more capacity and can be cleaned while in service. In addition, both diesel storage tanks were filtered and the associated transfer piping was flushed to remove any debris in the system. The licensee also accelerated their plans to drain, clean, inspect, and coat the fuel oil storage tanks and were evaluating additional corrective actions.

Analysis: The failure to correct an adverse condition in the fuel oil transfer system for EDG 1 was considered to be a performance deficiency. This finding affected the Mitigating Systems Cornerstone and was considered more than minor since it was associated with the operability, availability, and reliability of a mitigating system. During the Significance Determination Process, Phase 1, screening, the inspectors answered yes to Question 3 under the mitigating systems column because the finding represented an actual loss of safety function of a single train for longer than its TS allowed outage time. Therefore, a Phase 2 evaluation was performed using the following assumptions:

- The exposure period of the finding was 4 months, from the November 2003 event until the March 2004 event.
- EDG 1 was nonfunctional, but the licensee had adequate compensatory measures in place to clean and inspect the fuel oil strainer on an emergent basis. Therefore, a credit of 1 was applied for recovery of EDG 1.

The Phase 2 evaluation resulted in a low to moderate safety significance. A Phase 3 evaluation was performed with the following assumptions and results:

Internal Events

- The exposure time of the condition was 4 months (2920 hours).
- The Diesel Generator 1A day tank would have alarmed at its low level 3.5 hours into an event because of a clogged strainer. This was bounding because at least two 4-hour runs of the diesel during this period did not show signs of strainer fouling.
- If the day tank emptied completely, the diesel generator was assumed lost for further service. This was bounding because there would be some chance for recovery, especially if the diesel was shut down before the fuel was depleted.
- Diesel Generator 2A was not affected by the performance deficiency.
- When the day tank low level alarm was received, the licensee would have had 5 hours to diagnose and clean the strainer. Using Draft SPAR-H Method (INEEL/EXT-02-10307), the total nonsuccess probability of diagnosing and correcting the clogged strainer was $1.2E-3$.
- The strainer was assumed to clog in 3.5 hours. From that point, a 5-hour supply of diesel fuel oil remains in the day tank. Therefore, with no action, the diesel will run for 8.5 hours. This implied that the performance deficiency would only have had an impact on risk if offsite power was not recovered within 8.5 hours. The frequency-weighted nonrecovery probability is $6.6E-2$ at a time 8.5 hours after offsite power is lost.
- As a bounding assumption, it was assumed that Diesel Generator 1B fails at the same time that Diesel Generator 1A would fail given no operator action (8.5 hours after onset of a LOOP). This scenario would be the worst case (for the delta-CDF calculation) and simplifies the SPAR modeling. The reason this scenario is worst case is that it increases the likelihood of a longer period of time without ac power. Since all of the sequences adding to the delta-CDF have the Diesel Generator 1A operating successfully for 8.5 hours, if Diesel Generator 1B fails early in the scenario, there is a greater chance for its recovery before 1A fails. If they fail

simultaneously, the chances for a prolonged ac power outage is maximized. This assumption is particularly bounding, because some sequences have Diesel Generator 1B failing early (fail-to-start).

- The revised SPAR model result running in SAPHIRE was:

$$\text{Delta-CDF} = 1.275\text{E-}11/\text{hr (2920 hr. exposure/yr.)} = 3.7\text{E-}8/\text{yr.}$$

External Events

The plant-specific SDP worksheets do not currently include initiating events related to fire, flooding, severe weather, seismic, or other external initiating events. In accordance with Manual Chapter 0609, Appendix A, Attachment 1, step 2.5, "Screening for the Potential Risk Contribution Due to External Initiating Events," experience with using the Site Specific Risk-Informed Inspection Notebooks has indicated that accounting for external initiators could result in increasing the risk significance attributed to an inspection finding by as much as one order of magnitude. The analyst determined that an evaluation of external risk would not be required because the result of Phase 3 indicated that the risk was less than 1E-7. Therefore, an increase in the risk by an order of magnitude would not result in the significance of the finding crossing the 1E-6 threshold.

Large Early Release Frequency (LERF)

In accordance with Manual Chapter 0609, Appendix A, Attachment 1, step 2.6, "Screening for the Potential Risk Contribution Due to LERF," the analyst determined that the finding was not significant from a large early release frequency perspective and no further evaluation was necessary because the Phase 3 result provided a risk significance estimation of less than E-7.

Evaluation of the Licensee's Analysis

The licensee determined that the failure time of Diesel Generator 1A (8.5 hours) was greater than the mission time assumed in their PRA. Therefore, they considered the finding to have no impact on risk within the constraints of their risk model.

Conclusion

The finding was determined to have a delta-CDF and a delta-LERF less than 1.0E-7/yr. Therefore, the finding is considered to have very low risk significance (Green).

This finding also had crosscutting aspects associated with problem identification and resolution. This assessment was based on the fact that the licensee had identified corrective actions from the February and November 2003 strainer fouling that were not effectively implemented in a timely manner to prevent recurrence in March 2004. In

addition to this, the corrective actions primarily dealt with the symptoms caused by increased fuel storage tank corrosion, not the root causes. This approach created an operator workaround since manual action would be required to maintain an EDG operable during its 7-day mission time.

Enforcement: Appendix B, Criterion XVI, 10 CFR Part 50, states that, in the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective actions taken to preclude repetition. Contrary to this requirement, corrective actions for the strainer fouling in November 2003 failed to preclude an additional failure in March 2004. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000298/2004003-04). The licensee entered this issue into their corrective action program as SCR 2003-1876.

40A3 Event Followup

.1 Transient due to Loss of RRMG A

a. Inspection Scope

The inspectors performed a followup inspection of a plant transient which occurred on February 14, 2004. The transient was caused by the loss of RRMG A due to an exciter field brush failure which resulted in a field undervoltage condition. This followup inspection included a review of vendor information for the RRMG, a review of the PM program, and a review of the licensee's root cause determination.

b. Findings

Introduction. A self-revealing, Green finding occurred regarding the failure to perform adequate maintenance on RRMG A.

Details. On February 14, 2004, the inspectors responded to the control room following a plant transient due to the loss of RRMG A and subsequent reduction in reactor recirculation flow. Reactor power decreased to approximately 68 percent. The apparent cause, which was later confirmed by the licensee's root cause analysis, was the fact that the exciter brushes had worn to the point where the brush holders were no longer providing sufficient tension to maintain adequate contact between the brushes and the slip rings. This resulted in brush "chatter" and caused heavy pitting in the exciter slip rings and arcing and sparking. This eventually led to a loss of the exciter field, causing RRMG A to trip on low field voltage. After conducting repairs, RRMG A was restarted and the reactor was restored to full power operations on February 16.

The brushes on both RRMG sets had been modified in March 2003, to facilitate on-line maintenance of the machine. This modification included the installation of new brush holders as well as new brushes which could be easily replaced with the machine in operation. The licensee's root cause analysis concluded that the PM items associated

with the RRMG brushes were not modified at the time to reflect vendor recommendations for the new brush holders or brush material. The vendor manual stated that the typical brush would last 6 months; however, the licensee's PM program only required brush replacement every 18 months. At the time of the failure, the brushes on RRMG A had been in service for 10 months. In addition, the vendor recommended a cadre of daily, weekly, and monthly inspections of the exciter brushes; these inspections were not implemented following the modification.

The inspectors reviewed the root cause analysis for this event, which was documented in SCR 2004-0115. The licensee determined that the root cause of this event was the failure of the modification process to incorporate vendor recommended maintenance in the PM program. The investigation failed to determine why these recommendations had not been incorporated; however, it referenced the root cause in SCR 2003-1957, which contained a corrective action to establish programmatic controls to ensure vendor recommendations were incorporated in the PM program.

Analysis. The lack of an adequate PM program for RRMG brushes was considered a performance deficiency which affected the Initiating Events Cornerstone. This finding was considered more than minor since it affected the cornerstone attribute of design control 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, since it did not contribute to the likelihood of a primary or secondary system loss-of-coolant accident, did not contribute to a loss of mitigation equipment, and did not increase the likelihood of a fire or internal/external flood.

Enforcement. None of the components affected by this finding were considered safety-related; therefore, no violation of NRC requirements was identified. The licensee entered this finding into their corrective action program as SCR 2004-0115. This finding is identified as FIN 05000298/2004003-05.

.2 (Closed) LER 50-298/2004-002: Failure to Follow Procedure Results in Both Diesel Generators Being Inoperable

On March 23, EDG 1 was declared inoperable as a result of day tank float valve strainer fouling. As an interim compensatory measure to support EDG 2 operability, the fuel oil storage tank cross-tie valves were opened. On March 28, operators found fuel oil storage tank levels were not equalized. During the subsequent investigation it was discovered that DGDO-V-23 was closed, which resulted in both EDG's being declared inoperable. This issue is documented in Section 1R14.2. Enforcement aspects associated with this issue are documented in Section 4OA7. This LER is closed.

.3 (Closed) LER 50-298/2003-007: Automatic Reactor Scram Following Reactor Feed System Control Malfunction

On November 28, 2003, at 10:02 p.m., the Reactor Feed Pump Turbine B control system transferred from automatic to manual at a reduced speed, causing reactor

vessel level to lower, resulting in an automatic reactor scram on low reactor vessel water level. The licensee was unable to recreate the system malfunction and the approximate root cause was determined to be a spurious signal in the control system. The licensee installed radio frequency interference suppression devices, added more control room alarms to alert operators of a system transfer to manual, and installed additional grounds on the control cabinets. This LER was reviewed by the inspectors and no findings of significance were identified. The licensee's investigation into the cause of this condition is ongoing and is documented in the corrective action program as SCR 2003-1930. This LER is closed.

.4 (Closed) LER 50-298/2003-004-01: Manual Reactor Scram Due to Turbine High Vibration

This LER supplement was submitted by the licensee to provide additional information on the cause of the turbine blade failure and the long-term corrective actions. The original LER was closed in NRC Integrated Inspection Report 05000298/2003006. No new regulatory concerns were identified in the LER supplement. This LER is closed.

4OA4 Crosscutting Aspects of Findings

Sections 1R04.3, 1R15, and 4OA2 describe findings with crosscutting aspects associated with problem identification and resolution.

Section 1R14 describes a finding with crosscutting aspects associated with human performance.

4OA5 Other Activities (TI 2515/156, "Offsite Power System Operational Readiness")

a. Inspection Scope

The inspectors reviewed licensee documentation and conducted interviews in order to assess offsite power system operational readiness and to answer the specific questions in Attachment A to Temporary Instruction 2515/156 regarding the licensee actions that support the operational readiness of offsite power systems. The data was gathered to assess the operational readiness of the offsite power systems in accordance with NRC requirements, such as Appendix A to 10 CFR Part 50, General Design Criterion 17; Criterion XVI of Appendix B to 10 CFR Part 50, Plant TS for offsite power systems; 10 CFR 50.63; 10 CFR 50.65 (a)(4); and licensee procedures.

b. Findings

No findings of significance were identified. Based on the inspection, no immediate operability issues were identified. In accordance with TI 2515/156 reporting requirements, the inspectors provided the required data in the work sheets provided with the TI to the headquarters staff for further analysis.

Enclosure

4OA6 Meetings, Including Exit

On April 2, 2004, the inspectors presented the Permanent Plant Modification inspection results to Mr. R. Edington, Vice President/Chief Nuclear Officer, and other members of the staff who acknowledged the findings.

On May 13, 2004, the inspector conducted a telephonic exit meeting to present the results of the review of the CNS Emergency Plan revisions to Mr. J. Bednar, Emergency Preparedness Manager, and other members of his staff who acknowledged the findings.

On July 1, 2004, the inspectors presented the results of the resident inspector activities to Mr. S. Minahan, General Manager, Site Operations, and other members of his staff who acknowledged the findings.

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

4OA7 Licensee Identified Violations

Section 1R14.2 describes a licensee identified violation of very low safety significance (Green) which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as noncited violations.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

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
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
W. Macecevic, Work Control Manager
L. Schilling, Administrative Services Department Manager
R. Shaw, Shift Manager
J. Sumpter, Senior Staff Engineer, Licensing
K. Tanner, Shift Supervisor, Radiation Protection
D. Knox, Maintenance Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000298/2004003-01	NCV	Failure to Take Corrective Actions for Safety-Related Relay Actuations (Section 1R04.3)
05000298/2004003-02	NCV	Failure to Follow Tagout Procedure Results in Partial Containment Isolation (Section 1R14.1)
05000298/2004003-03	NCV	Failure to Follow Operability Determination Procedure (Section 1R15)
05000298/2004003-04	NCV	Failure to Take Corrective Actions on Diesel Fuel Oil System (Section 4OA2.3)

05000298/2004003-05 FIN Inadequate PM Results in Plant Transient (Section 4OA3.1)

Closed

50-298/2004-002 LER Failure to Follow Procedure Results in Both Diesel Generators Being Inoperable (Sections 1R14.2 and 4OA3.2)

50-298/2003-007 LER Automatic Reactor Scram Following Reactor Feed System Control Malfunction (Section 4OA3.3)

50-298/2003-004-01 LER Manual Reactor Scram Due to Turbine High Vibration (Section 4OA3.4)

DOCUMENTS REVIEWED

Calculations

NEDC 88-086B, *Setpoint Determination of Second Level Undervoltage Relays*, Revision 8
NEDC 86-105B, *Critical AC Bus Coordination Study*, Revision 7
NEDC 91-045, *Diesel Fuel Transfer Flow Rate with 8-5/8" Pump Impeller*, Revision 0C1
NEDC 93-104, *Emergency Transformer Permissive Relay Setpoint Calculation*, Revision 2
NEDC 95-003, *Determination of Operating Parameters for MOVs*, Revision 17
NEDC 00-003, *CNS Aux. Power System Load Flow and Voltage Analysis*, Revision 3
CED 6005840, *DB-50 Close Coil Fuse Replacement*, Revision 5
CED 6008662, *Setpoint Change to EE-REL-(27-ET3) & EE-REL-(27-ET4)*, July 12, 2002
CED 6008700, *Service Water Pump Performance Improvements*, Revision 0C2

Notifications

0010089339	0010230995	0010304548	0010304871	0010305106
0010097864	0010271946	0010304573	0010304987	0010305229
0010154503	0010291000	0010304669	0010304989	0010305273
0010173499	0010300927	0010304751		0010305281
0010186033				

Procedures

Administrative Procedure 0.40, *Work Control Program*, Revision 17

Alarm Procedure 2.3_DG1, *Panel/Window Location DG-1/4-1, Fuel Oil Level*, Revisions 4 and 6

Engineering Procedure 3.4, *Station Design Changes*, Revision 4

Maintenance Procedure 7.3.50.3, *SW 89A.B Minimum Flow Adjustment*, Revision 4

Maintenance Procedure 7.5.2, *MOV Testing and Data Analysis*, Revision 7

System Operating Procedure 2.2.20.1, *Diesel Generator Operations*, Revision 23

System Operating Procedure 2.2.20. 2, *Operation of Diesel Generators from Diesel Generator Rooms*, Revision 28

LIST OF ACRONYMS

CFR	<i>Code of Federal Regulations</i>
EDG	emergency diesel generator
FIN	finding
HPCI	high pressure core injection
LER	licensee event report
LERF	large early release frequency
NCV	noncited violation
NPP	nuclear power plant
NPPD	Nebraska Public Power District
PI	performance indicator
PM	preventive maintenance
RG	regulatory guide
RCR	resolve condition report
RHR	residual heat removal
RRMG	reactor recirculation motor generator
RTO/TSO	regional transmission organization
SCR	significant condition report
SW	service water
TS	Technical Specification