



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064**

January 25, 2001

J. H. Swailes, Vice President of
Nuclear Energy
Nebraska Public Power District
P.O. Box 98
Brownville, Nebraska 68321

SUBJECT: NRC INSPECTION REPORT 50-298/00-14

Dear Mr. Swailes:

On December 30, 2000, the NRC completed an inspection at the Cooper Nuclear Station facility. The enclosed report documents the inspection findings which were discussed on January 4, 2001, with Mr. John McDonald and other members of your staff.

The inspectors examined activities conducted under your license as they relate to safety and to 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 has identified three issues that were evaluated under the risk significance determination process as having very low safety significance (Green). These violations are being treated as noncited violations (NCVs), consistent with Section VI.A.1 of the NRC's 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; 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.

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Sincerely,

Charles S. Marschall, Chief
Project Branch C
Division of Reactor Projects

Docket No.: 50-298
License No.: DPR-46

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NRC Inspection Report
50-298/00-14

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-298
License No.: DPR 46
Report No.: 50-298/00-14
Licensee: Nebraska Public Power District
Facility: Cooper Nuclear Station
Location: P.O. Box 98
Brownville, Nebraska
Dates: November 5 through December 30, 2000
Inspectors: J. Clark, Senior Resident Inspector
M. Hay, Resident Inspector
Approved By: C. Marschall, Chief, Project Branch C
Division of Reactor Projects

ATTACHMENTS: 1. Supplemental Information
2. NRC's Revised Reactor Oversight Process

SUMMARY OF FINDINGS

IR 05000298, on 11/5-12/30/2000, Nebraska Public Power District, Cooper Nuclear Station Integrated Resident/Regional Report. Three Green violations occurred.

This inspection report covers a 7-week period of inspection by the resident inspectors.

The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609. The body of the report is organized under the broad categories of Reactor Safety, Safeguards, and Other Activities as reflected in the summary below.

- Green. The inspectors identified a lack of design control for service water pump bolting standards after operators reported finding loose foundation nuts. Conflicting information regarding the use of washers for the service water pump foundation bolts was provided in design documents. This is in violation of Criterion III of 10 CFR Part 50, Appendix B, for improper design control.

This noncited violation was determined to have very low safety significance because there would be no loss of service water function, based upon the remaining foundation bolts being properly fastened and the licensee's seismic analysis for the loose bolts (Section 1R04).

- Green. The inspectors determined that operations personnel did not perform an operability assessment for a safety-related service water pump, or declare the pump inoperable, when the functionality of the pump was questioned. The failure to perform an operability determination, as required by station procedure, is in violation of Technical Specification 5.4.1(a), for failure to follow Regulatory Guide 1.33, Appendix A, recommended procedures.

This noncited violation was determined to have very low safety significance because the nature of the failure was determined, through subsequent testing, to not affect the safety function of the service water pump (Section 1R14).

- Green. While performing undervoltage testing on Division 1 4160V Essential Bus 1F, technicians failed to follow a procedural step, resulting in an unplanned plant transient. An inadvertent undervoltage signal caused the following loads to trip: Reactor Recirculation Pump A, Service Water Pump A, Control Rod Drive Pump A, and selected nonessential 480 volt motor control centers. The failure to implement a surveillance procedure is in violation of Technical Specification 5.4.1(a), for failure to follow Regulatory Guide 1.33, Appendix A, recommended procedures.

This noncited violation was determined to have very low safety significance based upon a significance determination process analysis of the equipment lost, performed by the regional senior reactor analyst. The event lasted only 4 to 5 minutes, with one train of emergency core cooling systems remaining operable for the entire period (Section 1R22).

Report Details

On December 18, 2000, the plant was reduced to approximately 65 percent power after the trip of a reactor recirculation pump, due to a human error while conducting an undervoltage surveillance test. The plant was returned to full power on December 19, 2000. During all other times, the plant operated at 100 percent power, with the exception of minor power reductions for control valve testing and control rod pattern adjustments.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather

a. Inspection Scope

The inspectors reviewed or observed implementation of General Operating Procedure 2.1.11, Attachment 7, "Station Operator Ice and Snow Inspection," Revision 95, pertaining to the licensee's response to adverse weather. Operators took action to ensure continued system or component operation, including the following:

- Inspection of emergency diesel generator air intake structures for snow and ice fowling.
- Cold weather operation of circulating water / service water traveling screens.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed a partial system walkdown of the service system. System procedures and drawings were used to verify that the residual heat removal service water system was properly aligned.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a complete system walkdown of the residual heat removal service water system. System procedures and drawings were used to verify that the residual heat removal service water system was properly aligned. Following a potential water hammer event on November 27, 2000, the inspectors also visually examined pipe supports and pipe welds for signs of damage. System procedures and drawings were used to verify that the residual heat removal service water system was properly aligned.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

The inspectors sampled the licensee's corrective action program records to verify problems were identified at an appropriate threshold and evaluated for proper resolution. The sample was selected from recent problem identification reports for the service water and residual heat removal service water systems to follow the alignment inspections.

b. Findings

Station operators initiated a problem identification report (PIR 4-12730) to document that Service Water Pumps C and D had loose foundation bolts. The specific condition was the loosening of the pedestal nuts on the sole plate studs. The initiator of the report stated that this was a recurrent problem that was previously identified in 1998.

The inspectors examined the foundation stud and nut configuration for the four service water pumps. These configurations utilized no flat washers or locking washers as prescribed in Subsection NF of Section XI of the ASME code. The inspectors discussed this issue with system and design engineers. The engineers stated that the Cooper facility was not committed to this section of the ASME code. The inspectors questioned the engineers regarding the design requirements for the bolting of such components. The engineers also stated that structural bolting, such as the service water pump foundation bolts, was maintained in accordance with vendor recommendations.

The inspectors requested copies of vendor manuals, design drawings, and vendor correspondence that would describe the design configuration of the service water pump foundation bolting. These documents showed a number of configurations, since the initial construction of the plant. It was not clear to the inspectors or the engineers what constituted the current design standard. On December 28, 2000, the engineers contacted the vendor and received information that the pumps were originally supplied with spring washers. The vendor recommended the installation of washers in this

configuration. The vendor stated that, although installation without a washer was acceptable, it was not desirable. They also discussed approaches for solving the loosening nut problem with the design engineers.

Design engineers determined that there would be no loss of service water function, based upon the remaining foundation bolts being properly fastened, and a seismic analysis for the loose bolts. However, without appropriate design control, operators and maintenance personnel were not provided with a design standard for inspection or maintenance activities.

Criterion III of 10 CFR Part 50, Appendix B, requires that measures shall be provided to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. The failure to document and maintain a design standard for service water pump foundation bolting is a violation of Criterion III of 10 CFR Part 50, Appendix B. This violation is being treated as a noncited violation (50-298/0014-01) consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Problem Identification Report 4-13192.

This noncited violation was determined to have very low safety significance because there would be no loss of service water function, based upon the remaining foundation bolts being properly fastened and the licensee's seismic analysis for the loose bolts.

1R05 Fire Protection

a. Inspection Scope

The inspectors performed routine plant tours to assess the material condition of fire protection equipment and proper control of transient combustibles. The specific risk-significant areas inspected included the reactor building southwest quadrant, the cable expansion room, the control building basement, and the emergency condensate storage tank room.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Quarterly Simulator Training Review

a. Inspection Scope

The inspectors attended a simulator exercise for licensed operator requalification. The inspectors reviewed the scenario, observed event initiation, and monitored operator response to various plant problems. The inspectors observed the exercise for proper emergency plan usage, proper emergency declarations, and fidelity of the simulator to the actual control room.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

.1 Maintenance Effectiveness Reviews

a. Inspection Scope

The inspectors reviewed the licensee's maintenance rule implementation for the following structures, systems, or components that demonstrated performance problems:

- Division 1 service water system
- Division 2 residual heat removal service water system
- 4160V electrical distribution system

The inspectors verified that engineering personnel were adequately tracking and trending failures and performance data for these components. Selected problem identification reports associated with these systems were reviewed to determine if licensee staff had properly captured potential maintenance rule issues.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed risk assessments performed for selected planned maintenance activities and emergent work. The risk assessments were reviewed to verify that the licensee effectively controlled risk-significant configurations. The inspectors verified that work control and operations personnel were aware of risk categories and applicable contingency actions. The inspectors also verified that the licensee properly controlled troubleshooting and repairs associated with emergent work activities. Specifically, the following activities were reviewed:

- Inspection, troubleshooting, and repairs of selected 4160 volt circuit breakers following a generic concern affecting the breaker prop pin mechanism
- Inspection, troubleshooting, and repairs of selected 4160 volt circuit breakers following a generic concern affecting the operating mechanism crank shaft
- Undervoltage testing of 4160 volt Essential Bus F

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions and Events

a. Inspection Scope

On December 18, 2000, at 2:36 p.m., while performing undervoltage testing on Division 1 4160V Essential Bus 1F, a procedural noncompliance resulted in an unplanned plant transient. (See Section 1R22, "Surveillance Testing," for details.) The transient involved a trip of Reactor Recirculation Pump A, Service Water Pump A, Control Rod Drive Pump A, and selected nonessential 480 volt motor control centers. The transient also involved isolation of the nonessential service water header that supports the turbine equipment cooling system heat exchangers.

The inspectors reviewed operator logs, plant computer data, strip charts, and electrical drawings to determine what occurred and how the operators responded. The inspectors also conducted selected interviews with operations and engineering personnel to gather additional information related to cause of the event and subsequent plant restoration.

b. Findings

On December 19, 2000, the inspectors discussed the plant recovery actions with control room personnel. The operators stated that, with the exception of restoring service water, no other significant problems were identified. Prior to the event, Service Water Pumps C and D were running. Service Water Pump C tripped during the event at 2:36 p.m., on December 18, 2000. After Service Water Pump C tripped, operators immediately attempted to start Service Water Pumps A and C with no success. Operators then attempted to start Service Water Pump B twice with no success. Subsequently, testing personnel informed the control room operators that the event had occurred when an undervoltage signal on Division 1 4160V Essential Bus 1F resulted from a surveillance procedure that was not properly conducted. Licensed operators directed the recovery of the bus and subsequently were able to start Service Water Pump A after the low voltage condition was cleared at 2:40 p.m.

On December 19, 2000, control room personnel stated that engineers were presently evaluating why Service Water Pump B failed to start during the event, since it was not affected by the undervoltage condition associated with Division 1 4160V Essential Bus 1F. The inspectors noted that no operability determination had been performed to evaluate the degraded condition associated with Service Water Pump B failing to start, yet operators considered the pump operable. At 5:21p.m. on December 19, 2000, control room operators declared Service Water Pump B inoperable because they were unable to determine why the pump failed to start following the event on December 18, 2000.

Technical Specification 5.4.1(a) requires that licensees establish, implement, and maintain written procedures recommended in Regulatory Guide 1.33, Revision 2,

Appendix A, February 1978. Appendix A recommends procedures for authorities and responsibilities for safe operation. Administrative Procedure 0.5.OPS, "Operations Review of Problem Identification Reports/Operability Determinations/Evaluations," Revision 1, Section 3.1.12.3, states "An operability determination is required for degraded conditions of safety systems and components where functionality is called into question."

The failure to perform an operability determination on December 18, 2000, following the failure of Service Water Pump B to start twice, is a violation of Technical Specification 5.4.1(a). This violation is being treated as a noncited violation (50-298/0014-02) consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Problem Identification Report 4-13258.

The inspectors determined that this violation was a cross-cutting issue, involving human performance.

This noncited violation was determined to have very low safety significance because the nature of the failure was determined, through subsequent testing, to not affect the safety function of the service water pump.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the technical adequacy of three operability evaluations to determine if continued operability was justified. The reviewed assessments included:

- Environmental effects of a break in auxiliary steam piping located in the reactor building (PIR 4-12620)
- Potential water hammer event following start of Residual Heat Removal Service Water Pump A on November 27, 2000 (PIR 4-12754)
- 4160V Magne-Blast breaker prop pin clearance from breaker frame less than required (PIR 4-12835)

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspector performed a review of the current list of operator workarounds. The inspectors also reviewed the licensee's lower-tiered list of operator concerns to

determine if any of these issues should be considered as workarounds. The review also evaluated the cumulative affects of workarounds for the last 6-month period.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors observed or evaluated postmaintenance testing performed on the following equipment to determine whether the tests adequately confirmed equipment operability:

- Tests performed on Service Water Pump C following a breaker inspection
- Tests performed on the Division 2 diesel generator following emergent work to replace on overspeed sensor
- Tests performed on Service Water Pump B following breaker inspection

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the following tests:

- Surveillance Procedure 6.EE.301, "Emergency Bus Undervoltage Relays Testing and Calibration," Revision 2
- Surveillance Procedure 6.1EE.302, "4160V Bus 1F Undervoltage Relay and Relay Timer Functional test (Div 1)," Revision 6 C1
- Surveillance Procedure 6.1EE.303, "Emergency Bus Undervoltage (27) Relays Testing and Calibration (Div 1)," Revision 2

b. Findings

The inspectors identified no significant findings associated with the review of Surveillance Procedures 6.EE.301 and 6.1EE.303.

As discussed in Section 1R14, on December 18, 2000, Surveillance Procedure 6.1EE.302 was performed. During the performance of this surveillance, procedural steps were not performed resulting in an undervoltage signal being sensed by the protection circuitry for Division 1 Essential 4160V Bus 1F. Specifically, Surveillance Procedure 6.1EE.302, "4160V Bus 1F Undervoltage Relay and Relay Timer Functional test (Div 1)," Revision 6 C1, Attachment 7, step 16, required that Potential Test Switch TS-8 be placed to the up position at the end of testing. Technicians did not perform this step prior to removing test jumpers in the procedure, resulting in the processing of the sensed undervoltage condition. The inspectors determined that this was a human performance issue. Additionally, operators and engineers did not fully understand the sequence of events for several days.

Technical Specification 5.4.1(a) requires that licensees establish, implement, and maintain written procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for surveillance tests.

The failure to implement Surveillance Procedure 6.1EE.302, "4160V Bus 1F Undervoltage Relay and Relay Timer Functional test (Div 1)," Revision 6 C1, Attachment 7, step 16, is a violation of Technical Specification 5.4.1(a). This violation is being treated as a noncited violation (50-298/0014-03) consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented the failure to properly perform this surveillance in their corrective action process as Problem Identification Report 4-13137.

This noncited violation was determined to have very low safety significance based upon a significance determination process analysis of the equipment lost, the short duration of the event, and the availability of redundant mitigation equipment. The event lasted only 4 to 5 minutes, and one train of emergency core cooling systems remaining operable for the entire period.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

Inspection Scope

The inspectors reviewed logs and plant reports to verify the accuracy of reported data for the emergency ac power system unavailability and the high pressure injection system unavailability performance indicators. The inspectors also performed routine checks to ensure that locked high radiation areas were properly secured, while on tours throughout the plant.

b. Findings

No findings of significance were identified.

40A5 Other

.1 Closure of an Open Violation

Inspectors reviewed the status of previously cited violation 50-298/96030-03. This violation involved the failure to have administrative procedures to ensure that irradiated fuel was not added to the spent fuel pool faster than the pool's cooling system could accommodate. The inspectors reviewed the licensee's response to the violation and concluded that a root cause evaluation had been done and that corrective actions had been implemented. The inspectors reviewed Administrative Procedure 2.2.32, "Fuel Pool Cooling and Demineralizer System," Revision 34, June 2000, and determined that this procedure included adequate precautions and responses to monitor and respond to rising fuel pool temperatures. This item is closed.

40A6 Meetings

.1 Exit Meeting Summary

On January 4, 2001, the results of the inspection were discussed with Mr. John McDonald and other members of the Cooper staff. The plant management acknowledged the findings presented. Plant management informed the inspectors that no proprietary material was examined during the inspection.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Baldwin, Supervisor, Plant Engineering Department
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P. Caudill, Senior Manager of Technical Services
B. Dettman, Manager, Security
P. Donahue, Manager, Plant Engineering Department
J. Dubois, Acting Supervisor, System Engineering
C. Fidler, Assistant Maintenance Manager
M. Gillan, Manager, Outage Group
B. Houston, Quality Assurance Operations Manager
M. Kaul, Operations Support Specialist
J. Lewis, Manager, Reactor Engineering
W. Macecevic, Manager, Operations
S. Mahler, Assistant Manager, Licensing
C. Markert, Manager, Engineering Support Department
C. Blair, Senior Licensing Engineer
J. McDonald, Plant Manager
B. Rash, Senior Engineering Manager
R. Thorson, Manager, Work Control
R. Wachowiak, Supervisor, Risk Management

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed During this Inspection

50-298/0014-01	NCV	Failure to maintain design control for service water system
50-298/0014-02	NCV	Failure to perform operability determination and/or declare equipment inoperable
50-298/0014-03	NCV	Failure to properly implement a surveillance test procedure

Previous Item Closed

50-298/96030-03	VIO	Failure to Translate Design Basis Information into operational Procedures
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ATTACHMENT 2

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the significance determination process, and assigned colors of GREEN, WHITE, YELLOW, or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, or RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.