

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-298  
License No.: DPR 46  
Report No.: 50-298/98-06  
Licensee: Nebraska Public Power District  
Facility: Cooper Nuclear Station  
Location: P.O. Box 98  
Brownville, Nebraska  
Dates: August 23 through October 3, 1998  
Inspectors: M. Miller, Senior Resident Inspector  
V. Gaddy, Acting Senior Resident Inspector  
C. Skinner, Resident Inspector  
K. Weaver, Resident Inspector  
Approved By: C. Marschall, Chief, Branch C  
Division of Reactor Projects  
  
ATTACHMENT: Supplemental Information

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## EXECUTIVE SUMMARY

Cooper Nuclear Station  
NRC Inspection Report 50-298/98-06

### Operations

- Routine operational activities during the inspection period were generally good (Section O1.1).
- The development and review of the special instructions for securing Reactor Feedwater Pump A for troubleshooting the speed control system was very thorough. The instructions were reviewed by the operators, performed on the simulator, and approved by the Station Operations Review Committee. Operators performed the special instructions in a well controlled manner with appropriate oversight by the senior licensed reactor operators (Section O2.1).
- Inspectors identified that operations issued a nonconservative standing order, which listed the incorrect temperature (92°F versus 91°F) at which the reactor equipment cooling system would become inoperable (Section O3.1).
- A station operator exhibited good knowledge of plant operation during a walkdown of the reactor building. The station operator was familiar with the operation of prestaged equipment required to be used in an emergency situation (Section O4.1).

### Maintenance

- Overall, the maintenance activities observed were well-controlled and performed in a step-by-step manner (Section M1.1).
- The inspectors observed several examples of degraded material equipment which were corrected by the license. Overall plant material condition was good (Section 2.1).
- The licensee isolated the cause of the failure of the reactor building exhaust isolation valves to the solenoid operator, but have not determined the root cause. The licensee's corrective actions appeared to bound the potential causes to prevent another failure until the root cause can be determined and corrected (Section M2.2).

### Plant Support

- Radiation protection were observed performing their duties in accordance with management expectations and in accordance with the plant procedures. Good support was also provided to plant workers as needed (Section R1.1).

## Report Details

### Summary of Plant Status

At the beginning of the inspection period, the plant was at 100 percent power. On August 29, 1998, power was reduced to approximately 70 percent for turbine valve testing and was returned to 100 percent the next day. On September 7, power was reduced to approximately 70 percent to remove a feedwater pump from service due to speed control problems. The plant was restored to 100 percent on September 9. On September 11, the plant began coasting down in power and, on October 3, the licensee placed the plant in Mode 3 (hot shutdown) to begin the 18th refueling outage.

### I. Operations

#### **O1 Conduct of Operations**

##### **O1.1 Control Room Crew Effectiveness**

###### **a. Inspection Scope (71707)**

The inspectors performed routine inspections of operational activities during the inspection period.

###### **b. Observations and Findings**

During the inspection period, inspectors performed routine observations of operational activities. The inspectors observed that operating crews were focused on plant safety and maintained questioning attitudes. Information provided during shift turnovers was adequate to ensure safe plant operations. Logkeeping was thorough enough to provide relevant plant conditions and indications. Annunciator response and acknowledgment was good and the use of three-way communication was good.

###### **c. Conclusions**

Routine operational activities during the inspection period were generally good.

#### **O2 Operational Status of Facilities and Equipment**

##### **O2.1 Reactor Feedwater Pump A Speed Control Problem**

###### **a. Inspection Scope (71707)**

The inspectors reviewed special instructions associated with securing Reactor Feedwater Pump A and observed operators during the performance of these special instructions. Discussions were held with operators and management.



b. Observations and Findings

On September 7, 1998, the operators identified that Reactor Feedwater Pump A speed controller would not respond in the control room.

Special instructions for securing the reactor feedwater pump were developed with contingency actions. The special instructions were reviewed by the control room operators, performed on the simulator, and approved by the Station Operation Review Committee. Recommendations were incorporated into the special instructions after each review step.

The inspectors attended the prejob brief and observed the operators' performance of the special instructions. The inspectors questioned how the operators were to reduce reactor power, since neither the special instructions nor the briefing addressed this question. The shift supervisor stated that reactor power was to be reduced by lowering core flow, and an earlier briefing addressed this question. The special instructions were performed in a controlled manner, with appropriate oversight by senior licensed reactor operators.

The speed control system was corrected and the reactor feedwater pump was returned to service on September 8.

c. Conclusions

The development and review of the special instructions for securing Reactor Feedwater Pump A for troubleshooting the speed control system was very thorough. The instructions were reviewed by the operators, performed on the simulator, and approved by the Station Operations Review Committee. Operators performed the special instructions in a well controlled manner with appropriate oversight by the senior licensed reactor operators.

**O3 Operations Procedures and Documentation**

O3.1 Nonconservative Standing Order

a. Inspection Scope (71707)

The inspectors reviewed five current standing orders and held discussions with operators and engineers.

b. Observations and Findings

On September 16, 1998, inspectors identified that Standing Order 98-027, issued September 11, was nonconservative. Through discussions with engineering, the inspectors determined that 91°F was the temperature where the reactor equipment cooling system was inoperable. The standing order stated that 92°F was the temperature limit.

In response to the inspectors' questions, Standing Order 98-028 was issued, on September 16, that reflected the 91 °F temperature limit. The licensee documented this issue on a problem identification report. At the close of the inspection period, the licensee had not completed reviews to determine whether operators had relied on the incorrect value of the standing order.

The other four standing orders reviewed were appropriate and no other problems were identified.

c. Conclusions

Inspectors identified that operations issued a nonconservative standing order, which listed the incorrect temperature at which the reactor equipment cooling system would become inoperable.

**O4 Operator Knowledge and Performance**

O4.1 Nonlicensed Operator Performance

a. Inspection Scope (71707)

The inspectors observed a station operator perform his duties during a tour of the reactor building.

b. Observations and Findings

On September 25, 1998, the inspectors accompanied the station operator on a tour of the reactor building. The purpose of the tour was to observe the station operator perform a plant walkdown and to status plant equipment. Prior to the tour, the inspectors reviewed Procedure 2.1.11, "Station Operators Tours." The inspectors noted that the station operator conducted the plant walkdown in accordance with the requirements of the procedure. The station operator also exhibited good knowledge of plant operations and was aware of the purpose of various prestaged emergency equipment.

During the tour, the inspectors noted that housekeeping was good, with one exception. Housekeeping under the torus needed to be improved. The station operator indicated that he had observed the housekeeping deficiencies during an earlier plant tour and had informed the appropriate personnel.

c. Conclusions

A station operator exhibited good knowledge of plant operation during a walkdown of the reactor building. The station operator was familiar with the operation of prestaged equipment required to be used in an emergency situation.

**O8 Miscellaneous Operations Issues**

O8.1 (Closed) Violation 50-298/97006-01: Failure to follow Technical Specifications and inadequate procedure for re-inerting primary containment. This violation consisted of two examples of inadequate procedures. In the first example, a procedure did not allow the use of installed 24-inch valves for inerting the primary containment. In the second example, a procedure allowed operators to place the mode switch in the startup/hot standby position prior to performing the daily jet pump operability check contrary to the Technical Specifications. This review only addressed the first example associated with the use of 24-inch valves for inserting the drywell. The second example was closed in NRC Inspection Report 50-298/98-02.

The inspectors verified the corrective actions described in the licensee's response letter, dated August 25, 1997, to be reasonable and complete. No similar problems were identified.

O8.2 (Closed) Licensee Event Report 50-298/97008: Technical Specification 3.7.A.5.d time limit was exceeded. Technical Specification 3.7.A.5.d required that oxygen concentration be reduced to less than 4 percent within 24 hours or the reactor must be shutdown. The licensee requested enforcement discretion for this Technical Specification, which was granted by the NRC.

The inspectors verified that the licensee's corrective action have been completed; therefore, this licensee event report is closed.

**II. Maintenance**

**M1 Conduct of Maintenance**

M1.1 General Comments

a. Inspection Scope (61726 and 62707)

Inspectors reviewed work packages and held discussions with maintenance craft, operations, and management.

b. Observations and Findings

Inspectors observed the following maintenance activities:

Maintenance Work Request 98-2439	Repair leaking diesel generator starting air pressure relief valve
Maintenance Work Request 98-2748	Disassemble, inspection, and rebuild of reactor building basement sump pump



Surveillance Procedure 6.RCIC.302

Reactor core isolation: cooling pump low discharge flow channel calibration

Surveillance Procedure 6.1DG.101

Diesel generator 31 day operability test

The inspectors observed that the work activities were well controlled and work instructions were performed as written.

c. Conclusions

Overall, the maintenance activities observed were well controlled and performed in a step-by-step manner.

**M2 Maintenance and Material Condition of Facilities and Equipment**

M2.1 Material Condition

a. Inspection Scope (62707)

Inspectors performed plant walkdowns, observed maintenance, and reviewed a sample of maintenance activity records. Inspectors held discussions with various licensee staff and management.

b. Observations and Findings

Inspectors assessed plant material conditions during the course of the inspection period. Overall, plant material condition was good with the exception of the following examples.

- Reactor Building Exhaust Isolation Valves HV-AOV-259AV and -261AV failed surveillance testing requirements. The licensee increased the testing frequency from monthly to weekly and planned to replace the solenoid operator every 6 months until the cause of the failure can be determined.
- Reactor Feedwater Pump A speed control problems.
- Diesel generator air system pressure relief valve seal failed and resulted in an inoperable diesel generator.
- One of two sump pumps in the Core Spray Pump B room would not operate.

c. Conclusions

The inspectors observed several examples of degraded material equipment that were corrected by the licensee. Overall, plant material condition remained good.

**M2.2 Reactor Building Isolation Valves Failed Surveillance Test**

a. Inspection Scope (62707)

The inspectors followed the licensee's activities associated with the failure of the reactor building isolation valves. Discussions were held with operations, engineering, and management.

b. Observation and Findings

On September 16, 1998, both Reactor Building Exhaust Isolation Valves HV-AOV-259AV and -261AV failed surveillance testing requirements.

Troubleshooting activities isolated the failure mechanism to the solenoid operator. The licensee checked for binding and interference in the stroking of the valve and checked the air filters for contaminants; no problems were identified. The licensee concluded that the solenoid operator was being used in an appropriate application, and there was no foreign material in the air supply tubing or air supply filters. The licensee's evaluation has not ruled out a chemical interaction between a contaminant and the manufacturer's lubricant or an expansion or swelling of internal components. At the end of the inspection period, the licensee was still working on the root cause.

As corrective actions the licensee replaced both solenoid operators, increased the testing frequency from monthly to weekly, and implemented a preventive maintenance task to replace the solenoid operator every 6 weeks. These actions will continue until the cause of the failure can be determined. Based on past history, the inspectors concluded that these actions were appropriate.

An inspector followup item will be opened to review the licensee's evaluation for the repeated failures of the reactor building ventilation isolation valves (50-298/98006-01).

c. Conclusions

The licensee isolated the cause of the failure of the reactor building exhaust isolation valves to the solenoid operator, but have not determined the root cause. The licensee's corrective actions appeared to bound the potential causes to prevent another failure until the root cause can be determined and corrected.

**M8 Miscellaneous Maintenance Issues (92902)**

- M8.1 (Closed) Licensee Event Report 50-298/97005: Inadvertent start of Diesel Generator 1. An inadvertent slow start of the diesel generator during performance of Surveillance Procedure 6.1DG.302, "Undervoltage Logic Functional, Load Shedding and Sequential Loading Test." The licensee determined the start of the diesel generator was due to human factors deficiencies in the procedure. The procedure required installation of a jumper in a congested and not readily accessible area in the diesel generator control cabinet. Although the procedure had been used successfully in the past, a different type of jumper which had larger jaws was being utilized. During the installation of the jumper,



an electrician inadvertently touched the wrong terminal. This resulted in the completion of the slow start circuit and subsequently started the diesel generator.

The licensee's corrective actions included performing a procedure change to relocate the jumper installation point to a more readily accessible terminal in the cabinet. Subsequently, Procedure 6.1DG.302 was successfully performed. The licensee had performed an evaluation and planned to install permanent test jacks on the effected relays during Refueling Outage 18.

### **III. Engineering**

#### **E2 Engineering Support of Facilities and Equipment**

##### **E2.1 Reactor Equipment Cooling System Instrument Uncertainty**

###### **a. Inspection Scope (37551)**

The inspectors followed the licensee's actions in determining instrument uncertainty for the reactor equipment cooling system outlet temperature. Discussions were held with operations and engineering personnel.

###### **b. Observation and Findings**

From July 24 until September 11, 1998, engineering personnel provided nonconservative information to the control room regarding the operability of an essential system.

On July 24, engineering provided operations with the results (+/- 2.058°F) of an interim calculation on instrument uncertainty for the reactor equipment cooling system temperature until a formal calculation was completed. Based on this interim calculation, operations management issued Standing Order 98-021 which informed control room operators that at 93°F the reactor equipment cooling system becomes inoperable and the plant must be shut down. The inspectors questioned engineering personnel about "round off" and the correct number of significant digits. Based on the questions, engineering personnel revised the standing order to 92°F.

On August 23, Standing Order 98-024 was issued which stated that 93°F was the temperature limit for the reactor equipment cooling system. Then on September 11, engineering personnel provided a formal calculation to the control room that concluded instrument uncertainty was +/- 3.16°F.

At the end of the inspection report period, engineering was reviewing whether the reactor equipment cooling system was operated outside the design basis (adding the correction factor for instrument uncertainty). The inspectors will track the review of this evaluation on past operability by an inspector followup item (50-298/98006-02).

c. Conclusions

The inspectors identified that nonconservative information was provided to the control room by engineering personnel on the reactor equipment cooling system temperature. Instrument uncertainty of the temperature indicator was calculated to be  $\pm 2.058^{\circ}\text{F}$  and over a month later engineering performed a formal calculation which determined instrument uncertainty to be  $\pm 3.16^{\circ}\text{F}$ .

**E8 Miscellaneous Engineering Issues**

E8.1 (Closed) Inspector Followup Item 50-298/98004-06: Replacement component evaluations failed to address test equipment. Inspector Followup Item 50-298/98005-03 already tracked this item; therefore, the inspector followup item is closed and the results of followup inspections will be tracked by Inspector Followup Item 50-298/98005-03.

E8.2 (Closed) Violation 50-298/96030-02: Failure to comply with 10 CFR 50.59 - residual heat removal system not required to be available during full core offloads. This violation consisted of the licensee's failure to ensure that Residual Heat Removal Train B was available to assist the fuel pool cooling system during full core offloads or to perform a 10 CFR 50.59 evaluation that demonstrated the Residual Heat Removal Train B was not needed to be available.

The inspectors verified the corrective actions described in the licensee's response letter, dated January 20, 1997, to be reasonable and complete. No similar problems were identified.

**IV. Plant Support**

**R1 Radiological Protection and Chemistry Controls**

R1.1 Radiation Protection Personnel Performance

a. Inspection Scope (71750)

The inspectors assessed the performance of radiation protection personnel during plant tours.

b. Observations and Findings

During this inspection period, the inspectors made frequent tours of the radiologically controlled area. Radiation protection personnel were observed working in accordance with requirements of management expectations and plant procedures. Radiation protection personnel also provided good support to plant workers as needed. Surveys performed by radiation protection personnel were conducted in accordance with plant procedures.

On September 29, 1998, the inspectors observed the support provided by radiation protection personnel to a maintenance mechanic during the disassembly, inspection,

and rebuild of the reactor building basement sump pump located in the southeast quadrant. The work was performed in a highly contaminated area. The radiation protection technician performed frequent surveys of the work area, surveyed equipment as it was disassembled, and ensured that the maintenance mechanic performed work in accordance with the requirements of the radiation work permit.

c. Conclusions

Radiation protection personnel were observed performing their duties in accordance with management expectations and in accordance with the plant procedures. Good support was also provided to plant workers as needed.

**X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the exit meeting on October 6, 1998. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.



## ATTACHMENT

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

M. Boyce, Plant Engineering Manager  
P. Caudill, General Manager, Technical Services  
L. Dewhirst, Licensing Engineer  
C. Gaines, Maintenance Manager  
B. Houston, Licensing Manager  
T. Kissam, Diesel Generator System Engineer  
D. Kunsemiller, Licensing Consultant  
M. Peckham, Plant Manager  
J. Peters, Licensing Secretary  
B. Rash, Senior Engineering Manager  
A. Shiever, Operations Manager  
J. Sumpter, Licensing Supervisor

#### NRC

T. Meadows, NRC Examiner

### INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering  
IP 61726: Surveillance Observation  
IP 62707: Maintenance Observation  
IP 71707: Plant Operations  
IP 71750: Plant Support Activities  
IP 92901: Followup - Plant Operations  
IP 92902: Followup - Maintenance  
IP 92903: Followup - Engineering  
IP 92700: Licensee Event Report - Onsite Review  
IP 93702: Onsite Response

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

50-298/98006-01	IFI	Review licensee's evaluation for the repeated failures of the reactor building ventilation isolation valves (Section M2.2).
50-298/98006-02	IFI	Review past operability of the reactor equipment cooling system taking instrument uncertainty into account (Section E2.1).

#### Closed

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|-----------------|-----|--|
| 50-298/97006-01 | VIO | Failure to follow Technical Specification and inadequate procedure for re-inerting primary containment (Section O8.1).                   |
| 50-298/97008    | LER | Technical Specification 3.7.A.5.d time limit was exceeded (Section O8.2).  |
| 50-298/97005    | LER | Inadvertent start of Diesel Generator 1 (Section M8.1).  |
| 50-298/98004-06 | IFI | Replacement component evaluations failed to address test equipment (Section E8.1).   |
| 50-298/96030-02 | VIO | Failure to comply with 10 CFR 50.59 - residual heat removal system not required to be available during full core offloads (Section E8.2) |

Discussed

- |                 |     |  |
|-----------------|-----|--|
| 50-298/98005-03 | IFI | Failure to specify testing requirements for replacement relays (Section E8.1). |
|-----------------|-----|--|