

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-298/91-27

Operating License: DPR-46

Docket: 50-298

Licensee: Nebraska Public Power District  
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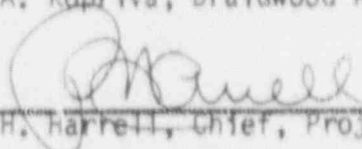
Facility Name: Cooper Nuclear Station

Inspection At: Nemaha County, Nebraska

Inspection Conducted: December 7, 1991, through January 18, 1992

Inspectors: W. C. Walker, Resident Inspector  
R. V. Azua, Fort Calhoun Station Resident Inspector  
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Approved:

  
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1-30-92  
Date

Inspection Summary

Inspection Conducted December 7, 1991, through January 18, 1992  
(Report 50-298/91-27)

Areas Inspected: Routine, unannounced inspection of a previously identified inspection finding, onsite followup of events, operational safety verification, surveillance and maintenance observations, security and radiological protection observations, verification of containment integrity, and observation of activities during plant startup.

Results:

- ° The licensee has experienced a number of events related to the operation of the reactor water cleanup system. It is not apparent that the root cause of some of the events was fully determined by the licensee. This issue is considered unresolved (paragraph 4.a).
- ° An inadvertent start of an emergency diesel generator was experienced because of a lack of attention to details by operations personnel and the use of a customized procedure (paragraph 4.b).
- ° Control room operators responded appropriately to address a feedwater/reactor water level transient (paragraph 4.c).

- Management level review was planned to identify causes and corrective actions to the reactor water level transient (paragraph 4.c).
- The licensee's corrective action program was weak in that it did not programmatically address the reactor water level transient (paragraph 4.c).
- The failure to declare an unusual event on July 30, 1991, when both diesel generators (DGs) were declared inoperable, is an unresolved item (paragraph 4.d).
- Operations staff performed their duties in a professional manner during plant startup and full power operations (paragraph 6.a).
- Plant startup was performed without any problems (paragraph 9).
- Traffic into and out of the control room was kept to a minimum level (paragraph 6.a).
- Radiation protection and security personnel performed their duties in a satisfactory manner (paragraphs 6.c and d).
- Maintenance personnel exercised good ALARA practices during maintenance activities (paragraph 6.c).
- Good communications between operations personnel and the affected crafts was apparent during surveillance activities (paragraph 7).
- Good work practices by plant personnel during maintenance activities were noted, plus good procedural compliance (paragraph 8).

DETAILS1. Persons ContactedPrincipal Licensee Employees

J. M. Fracham, Division Manager of Nuclear Operations  
 E. M. Mace, Senior Manager of Staff Support  
 R. L. Gardner, Senior Manager of Operations  
 J. R. Flaherty, Engineering Manager  
 R. Brungardt, Operations Manager  
 H. T. Hitch, Plant Services Manager  
 M. E. Unruh, Maintenance Manager  
 L. E. Bray, Regulatory Compliance Specialist  
 S. M. Peterson, Senior Manager of Technical Support Services  
 T. J. Chard, Radiological Manager  
 R. L. Wenzl, Nuclear Engineering Department Site Manager  
 R. C. Deatz, Senior Quality Assurance Specialist  
 R. A. Jansky, Outage & Modifications Manager  
 C. M. Estes, Management Trainee

The above personnel attended the exit interview held on January 17, 1992.

The inspectors also contacted other personnel.

2. Plant Status

The 73-day, Cycle 14 refueling outage ended on December 15, 1991, when the licensee declared the reactor critical. The plant was synchronized to the grid on December 16. The reactor operated at essentially full power from December 27 through the end of the inspection period.

3. Followup of a Previously Identified Inspection Finding (92/02)

(Closed) Unresolved Item 287/9123-02: Adequacy of a Safety Evaluation for the DGs

During a previous inspection, an inspector had a concern that the safety evaluation for Design Change 90-275, "Replacement of the Cranking Limit Time Delay Relay 62CLX DG No. 1 and DG No. 2," did not identify an unreviewed safety question. On January 16, 1992, a telephone conference was held with the licensee, Office of Nuclear Reactor Regulation, and Region IV personnel.

During the conference call, the licensee provided additional information demonstrating that an unreviewed safety question did not exist. On the basis of the additional information, this unresolved item is considered closed.

#### 4. Onsite Followup of Events (93702)

##### a. Reactor Water Cleanup (RWCU) Isolations

On December 21, 1991, the licensee experienced a primary containment isolation of the RWCU system. A high RWCU system flow isolation signal was generated when operators attempted to return the B RWCU filter demineralizer to service after precoating of the filter. Preliminary review of this event by the licensee indicated that the flow switch setpoint was reached as a result of an apparent flow surge that occurred due to the filter demineralizer not being full. The cause of this condition was attributed to a valve misalignment, due to operator error, during the venting and backwashing effort prior to returning the filter demineralizer back to service. The inspectors will review the licensee's corrective action when followup of Licensee Event Report (LER) 91-022 is performed.

On January 11, 1992, another primary containment isolation of the RWCU system, resulting from high system flow, was experienced by the licensee. This high RWCU system flow isolation occurred when operators were transferring operation from the A to the B RWCU pump. The purpose of this exercise was to perform postmaintenance testing of the B pump discharge check valve. A bonnet gasket on the B pump discharge check valve had been repaired earlier in the week and the operator was attempting to verify successful repair of the bonnet gasket by inservice leak testing. The RWCU filter demineralizers were removed from service, and bypass Valve RWCU-MO-MO74 was open. Preliminary review of this event by the licensee indicates inadequate venting of the B RWCU pump casing and piping, which caused a high flow surge resulting in the high flow isolation. The inspectors will review the licensee's corrective actions when followup of LER 92-001 is performed.

On review of the LERs for the year 1991, the licensee has experienced a number of events associated with the RWCU system. These events appear to be the result of inherent system design problems and recent modifications that may have altered system performance characteristics. It is also apparent that, due to the limited instrumentation available on this system, there were some cases where the root cause determinations required a certain amount of speculation which resulted in inadequate corrective action, in at least one occasion.

The licensee has stated that they are aware of the number of recent events associated with this system and have confidence that recent modifications to the system will mitigate some of the cause of previous events. In addition, the licensee plans to review previous RWCU events to determine if a commonality exists between them.

The resident inspectors will determine the effectiveness of the licensee's corrective actions with regard to this system, during review of associated LERs and system operation during future inspections.

b. Inadvertent Start of an Emergency Diesel Generator

On December 14, 1991, with the plant in cold shutdown for a refueling outage, an automatic start of the No. 1 emergency diesel generator and actuation of the Group 2, 3, 6, and 7 isolations occurred. Licensed personnel were in the process of timing two relays to determine the reason for discrepancies in previously reported test results. While performing the surveillance procedure, a step that would block the undervoltage trip of Breaker 1FA was overlooked. Upon actuating the test switch, Breaker 1FA tripped, resulting in the actuations.

Review of this event by the licensee indicates the operator failed to perform an action specified by the procedure. A contributing cause was the use of a normal surveillance procedure with a significant number of steps marked "not applicable." This resulted in the steps to be performed being separated by several pages. The inspectors will review the licensee's corrective actions as specified in LER 91-021.

c. Reactor Feedwater Flow Oscillations

On January 14, 1992, while the plant was at 100 percent power, Reactor Feedwater Pump (RFP) A unexpectedly ran back to its minimum feedwater flow setting. RFP B automatically increased flow output to compensate for the resultant loss of reactor feedwater flow and continued to increase flow until it reached its upper limit, at which point the pump turbine locked in a hold condition.

Reactor water level initially decreased to 15 inches on narrow-range indication, setting off the low reactor water level alarm (27.5 inches). Level began to increase as a result of the increased flow from RFP B. Operators took immediate action by taking manual control of the feedwater control system. The reactor water level continued to increase, setting off the reactor water level high alarm (42.5 inches), until its rise was stopped at the 57-inch, narrow-range level. This was 1.5 inches from the RFP and main turbine trip setpoint (58.5 inches).

Upon review, the licensee determined that the cause of this event was related to troubleshooting efforts being performed on the digital processing computer (DPC) for the signal processing unit of the reactor water level control system.

The DPC performs two main functions in the control system. When selected via the reactor feedwater pump turbine startup station, the DPC provides an automatic startup function. The DPC also provides

on-line monitoring of critical electronic control processes with a display of control system conditions locally on the signal processing unit color monitor. In addition, it generates the common system alarms upon sensing abnormal control signals.

The licensee has not used the automatic start function of the DPC, but only has used its monitoring function. The licensee had identified a problem in the DPC monitoring function (i.e., it appeared to fail to provide alarm indications, as required). As a result, the licensee consulted with the system vendor (Lovejoy), who recommended that rebooting the computer program may correct the problem. The vendor assured the licensee that such action, while the computer was set in its monitoring function, would not affect reactor feedwater control. The licensee, based on this recommendation and management review, proceeded to reboot the DPC. It was during this effort that the feedwater event occurred.

The licensee is presently investigating the cause of the event with the aid of the system vendor. Initial steps, taken to prevent recurrence of this event, included administratively preventing any further manipulations of the DPC until the cause of this event is identified and corrected.

As a result of the inspector's questions, the licensee planned to convene a Corrective Action Review Board due to the potential significance of this event. The Corrective Action Review Board is one of the only other methods available to the licensee to track the corrective actions of events that do not rise to the significance of a nonconformance report.

Inspectors concluded that appropriate management attention was planned to review this transient. The licensee's corrective action program, however, did not require any formal documentation, review, offsite review, or root cause analysis because the feedwater excursion/reactor water level transient did not result in an engineered safeguards initiation; therefore, did not rise to the threshold that requires generation of a nonconformance report. Thus, the licensee's corrective action program was weak in that it did not programmatically address events of this type that need corrective action. A detailed review of the licensee's program will be performed in the future. This issue is considered unresolved pending further NRC review (298/9127-01).

- d. In NRC Inspection Report 50-298/92-01 for emergency preparedness, weaknesses were observed in simulator scenarios involving the declaration of an unusual event when both DGs were inoperable. Inspectors reviewed an actual occurrence, July 30, 1991, where the licensee declared both DGs inoperable, to assess emergency plan implementation.

On July 30, both DGs were declared inoperable because of inadequate seismic qualifications of the DG heating, ventilation, and air conditioning units. The provisions of the Technical Specification action statements for two inoperable DGs were implemented to reduce reactor power to 25 percent.

Emergency Plan Implementing Procedure 5.7.1, Attachment B, Step 4.1.2, specified that loss of both onsite DGs, with offsite power available, is a condition requiring the declaration of an unusual event. Licensee management concluded that even though both DGs were declared inoperable, they were not lost; therefore, the condition of July 30 did not warrant declaration of an unusual event. The licensee did not declare an unusual event.

The licensee's decision to treat the DGs as not capable of performing their function for Technical Specification purposes and, at the same time, as capable of performing their function for emergency plan implementation was inconsistent. The failure to declare an unusual event when both diesels were declared inoperable is an unresolved item pending further NRC review (298/9127-02).

### Conclusions

The licensee has experienced a number of problems with the RWCU system over the past year. In some cases, it did not appear that the licensee had adequately determined the root cause for all events. The licensee stated that a review would be performed of the RWCU events to determine whether a common mode problem exists.

An event related to the inadvertent start of a DG was caused by the failure of operations personnel to follow a procedure where many of the steps in the procedure were annotated as "not applicable." This is an indication of a lack of attention to details by operations personnel and the inappropriate use of a customized procedure for performance of plant evolutions.

Control room operators responded appropriately to address a feedwater/reactor water level transient. Management level review was planned to identify causes and corrective actions. The licensee's corrective action program was weak in that it did not programmatically address events of this type that need corrective action.

The failure to declare an unusual event on July 30, 1991, when both DGs were declared inoperable, is an unresolved item.

### 5. Verification of Containment Integrity (61715)

The purpose of this inspection was to verify that the licensee had established containment integrity prior to commencing heatup of the reactor coolant system above 200°F.

- ° Review of the airlock local leak rate test performed after the final containment closure
- ° A walkdown of the standby gas treatment system, which is designed to mitigate contamination release in the event of a loss-of-coolant accident

### Conclusions

The inspector verified, based on the items reviewed, that the licensee had properly established containment integrity prior to plant startup.

## 6. Operational Safety Verification (71707, 60705, 60710)

### a. Outage Activities

During the refueling outage, from October 5 to December 17, 1991, the licensee performed the following major work:

- ° Replaced all 52 reactor vessel head studs
- ° Replaced all 1,096 Control Rod Drive flange cap screws
- ° Refurbished both low pressure sections of the main turbine
- ° Inspected and overhauled both the high pressure coolant injection and reactor core isolation coolant turbines
- ° Completed the control room annunciator upgrade project
- ° Overhauled one of two reactor feed pump turbines
- ° Replaced all 4160/480-volt plant transformers
- ° Replaced rotating assemblies and refurbished the motors of both reactor recirculation pumps
- ° Replaced 164 fuel assemblies

### b. Control Room Observation

The inspectors observed operational and outage activities throughout this inspection period. Proper control room staffing was maintained and control room professionalism and decorum were observed. Traffic into and out of the control room was kept to a minimum. Discussions with operators determined that they were cognizant of plant status. The inspectors observed selected shift turnover meetings and noted that excellent transfer of information concerning plant status and planned evolutions occurred between the offgoing and the oncoming operators. The inspectors routinely verified, by visual inspection of emergency core cooling system valve indications, that the systems



were maintained in a standby condition, as required during plant shutdown. The inspectors observed that Technical Specification limiting conditions for operation were properly documented and tracked by the control room staff.

c. Radiological Protection Observations

The inspectors verified that selected activities of the licensee's radiological protection program were properly implemented. Radiation and contaminated areas were properly posted and controlled. Health physics personnel were observed routinely touring the controlled areas. Workers were observed complying with health physics procedures.

During maintenance activities, plant personnel were found to exercise good radiological protection practices. These practices included using "hot" tools located in work areas, maintaining a good awareness of the dose rates in the work areas (i.e., by reading the survey map, using a radiation detector, and maintaining a distance from the "hot spots"), and by preplanning the effort to minimize the amount of time they were to spend in the area.

d. Security Program Observations

The inspectors observed selected aspects of the security program. Personnel, packages, and vehicles were noted to be properly searched before entering the protected area. It was noted that guards were posted when vital area doors were open for plant activities.

Conclusions

Operators appropriately maintained traffic in the control room. Health physics and security personnel performed their duties in a satisfactory manner.

7. Surveillance Observations (61726)

On December 14, 1991, the inspectors monitored the performance of SP 6.3.18.8, "Service Water Gland Water IST Pump Test." This test verified the operational readiness of service water gland water Pumps A, B, C, and D in accordance with plant Technical Specifications and the inservice test program. The inspectors questioned the operator and technicians involved in the test and determined that they were knowledgeable of the purpose of the surveillance test and familiar with their respective responsibilities for the performance of this test. Good communications were noted between the technician and the control room operator.

The test results obtained during the test met the acceptance criteria set forth in the procedures. The inspector observed the operator and

technician reviewing the data taken locally and comparing it to the data entered in the controlled procedure. No errors were noted.

### Conclusions

Good communications were noted during the performance of surveillance testing.

#### 8. Maintenance Observations (62703)

On January 15, 1992, the inspectors observed a mechanic and an electrician remove three ASCO solenoid valves (RW-50V-A0245A, -A0245B, and A0242A(1)) from their associated valve actuators in the laboratory radioactive waste drain tank room. These solenoid valves had been identified as having air leaks and were being removed for refurbishment, as directed by Maintenance Work Request (MWR) 91-3604. During this effort, the mechanic and electrician exercised good radiological protection practices.

The solenoid valves, once removed, were bagged accordingly and surveyed by a health physics technician. Once cleared for removal, the valves were taken to the multipurpose facility where the valves were decontaminated.

As directed by the MWR, the valves were refurbished according to Maintenance Procedure 7.2.49, "ASCO Solenoid Valve Maintenance." The valves were refurbished by a mechanic while another looked on, providing the independent review, as required by plant quality control procedures. The valves were leak tested after refurbishment. The inspectors reviewed the MWR and the maintenance procedure and found them to be approved as indicated by the appropriate signatures.

### Conclusion

Good work practices by plant personnel were noted during this inspection. Procedural compliance was found to be good.

#### 9. Plant Startup From Refueling (71711)

The purpose of this inspection was to ascertain whether plant startup, heatup, approach to criticality, and core physics testing, following the refueling outage, were conducted in accordance with approved procedures.

On December 15-16, 1991, the inspectors witnessed the following activities during startup of the unit:

- ° Verification that the control rod withdrawal sequence and rod withdrawal authorizations were available and all surveillance tests required to be performed before the startup were satisfactorily completed
- ° Verification that the startup was being performed in accordance with technically adequate and approved procedures

- ° Verification that startup activities were conducted in accordance with requirements of the Technical Specifications
- ° Performance of core physics tests and verification that they were performed in accordance with technically adequate and approved procedures and requirements of the Technical Specifications

The licensee commenced a reactor startup on December 15 and the reactor was taken critical at 9:51 p.m. On December 16 the licensee synchronized the main generator to the grid, thus ending a 73-day refueling outage.

#### Conclusions

The plant was started up without problems. It appeared, based on the items observed and reviewed, that plant startup was performed in accordance with the appropriate requirements.

#### 9. Exit Interview

An exit meeting was conducted on January 17, 1992, with the licensee representatives identified in paragraph 1. During this meeting, the inspectors reviewed the scope and findings of the inspection. During the exit meeting, the licensee did not identify as proprietary, any information provided to, or reviewed by, the inspectors.