

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-298/88-23

License: DPR-46

Docket: 50-298

Licensee: Nebraska Public Power District (NPPD)  
P. O. Box 499  
Columbus, NE 68601

Facility Name: Cooper Nuclear Station (CNS)

Inspection At: Cooper Nuclear Station, Nemaha County, Nebraska

Inspection Conducted: July 5-31, 1988

Inspector: *W. R. Bennett* *8/1/88*  
W. R. Bennett, Senior Resident Inspector Date

Approved:  *8/8/88*  
G. L. Constable, Chief, Project C, Division of Date  
Reactor Projects

Inspection Summary

Inspection Conducted July 5-31, 1988 (Report 50-298/88-23)

Areas Inspected: Routine, unannounced inspection of Licensee Event Reports followup, operational safety verification, monthly surveillance and maintenance observations, radiological protection, and security.

Results: Within the areas inspected, no violations were identified.

DETAILS

1. Persons Contacted

Principal Licensee Employees

- \*G. R. Horn, Division Manager of Nuclear Operations
- J. M. Meacham, Senior Manager for Technical Support (SMTS)
- R. Brungardt, Operations Manager
- J. Flaherty, Plant Engineering Supervisor
- \*G. E. Smith, Quality Assurance Manager
- \*L. E. Bray, Regulatory Compliance Specialist
- \*G. R. Smith, Licensing Supervisor
- \*R. Gardner, Management Trainee
- \*R. W. Faust, Engineering Manager
- \*C. R. Moeller, Acting SMTS
- \*D. Norvell, Maintenance Manager

The NRC inspector also interviewed other licensee employees during the inspection period.

\*Denotes those present during the exit interview conducted on July 28, 1988.

2. Plant Status

The plant operated at essentially full power during the entire inspection period except for July 15-17, 1988. On July 15, the licensee manually scrammed the reactor from approximately 80 percent power due to electrical arcing in the main generator, Phase A, outlet bus ducting. After repairs, the reactor went critical on July 16 and was synchronized to the grid on July 17.

3. Licensee Action on Previously Identified Inspection Findings (92702)

(Closed) Violation 298/8806-01: Failure To Ensure Jet Pump Operability - This item concerned the failure to ensure jet pump operability prior to reactor startup as required by Technical Specifications (TS).

Corrective actions committed to by the licensee included developing a new recirculation pump flow characteristics curve for ensuring jet pump operability during subcritical reactor operations, and routing a copy of the new characteristics curve to all licensed operators.

The senior resident inspector (SRI) verified that the new characteristics curve was available in the control room and had been routed to all licensed operators. In addition, the SRI verified that the curve was correctly used during two reactor startups.

This item is closed.

(Closed) Violation 298/8807-01: Failure to Follow Health Physics Procedure - This item concerned an individual inside an area covered by a special work permit (SWP) without meeting all the requirements of the SWP.

Corrective actions committed to by the licensee included maintenance department supervisors discussing the event with maintenance department personnel, and stressing the importance of adhering to station procedures.

The SRI verified that these discussions were held.

This item is closed.

4. Licensee Event Reports (LERs) Followup (92700)

(Closed) LER 87-022: This LER documents an inadvertent isolation of the Reactor Water Cleanup (RWCU) System during calibration and functional testing of the Primary Containment Isolation System (PCIS) isolation logic circuitry per Surveillance Procedure (SP) 6.2.1.2.1. The cause of the event was determined to be personnel error. The technician failed to ensure that the isolation condition inserted by the procedure was reset prior to reenergizing the valve operator.

Corrective actions included revising the procedure to caution operators of the expected system response, and performing an engineering evaluation to determine if improved status information associated with the isolation circuitry could be provided.

The SRI reviewed the engineering evaluation for this LER. The evaluation specified that Design Change 87-15L would provide isolation status lights in the control room. The SRI verified that isolation status lights are operable in the control room. The SRI reviewed SP 6.2.1.2.1, "PCIS RWCU High Flow Calibration and Functional/Functional Test," Revision 13, dated April 14, 1988, and verified that a caution note warns operators of the expected system response, and that the operator is directed to verify that isolation status lights are on or off as required.

This LER is closed.

LER 88-011: This LER documents an unplanned Group 6 isolation and actuation of the standby Gas Treatment System. The cause of the event was a communication problem when isolating the 24V DC batteries for maintenance.

Corrective actions included discussing this event with all operations and maintenance personnel emphasizing their responsibilities when isolating equipment.

The SRI verified that discussions of the event had occurred.

This LER is closed.

5. Operational Safety Verification (71707)

The SRI observed operational activities throughout the inspection period. Proper control room staffing was maintained, and control room activities and conduct were observed to be well controlled. Discussions with operators revealed that they were cognizant of plant status and understood the importance of, and reason for, each lit annunciator. The SRI observed selected shift turnover meetings and verified that information concerning plant status was communicated to the oncoming operators. Tours of accessible areas at the facility were conducted to confirm operability of plant equipment. Overall plant cleanliness was observed to be good throughout the inspection period.

On July 15, 1988, at approximately 9:45 a.m., a fire was reported in the main building. The fire brigade immediately responded. Electrical arcing was observed in the main generator, Phase A, outlet bus ducting. The licensee reduced power and manually scrammed the reactor from approximately 80 percent power at 9:58 a.m. The SRI was in the control room at the time of the power reduction and scram, and noted that the evolution was performed in a controlled, conservative manner. All actions associated with the shutdown were timely and well planned.

On July 16, 1988, the SRI observed a reactor startup following repairs to the bus ducting. The SRI attended the Station Operations Review Committee (SORC) meeting on July 16, which reviewed the event and authorized restart. The cause of the event was addressed and reactor startup was authorized in accordance with General Operating Procedure (GOP) 2.1.1.1, "Reactor Startup Review," Revision 2, dated June 30, 1988. All conditions and requirements for startup were properly met and documented in GOP 2.1.1.2, "Technical Specification Pre-Startup Checks," Revision 7, dated December 10, 1987. The startup was performed in a controlled, cautious manner. The reactor was declared critical at 2:18 p.m. on July 16, and synchronized to the grid at 2:35 a.m. on July 17.

During a routine plant tour on July 25, 1988, the SRI noted that two sway strut supports for the fuel injection return headers of Diesel Generators 1A and 1B were loose. The supports being loose do not affect the operability of the diesel generators. The SRI questioned the licensee about how the supports became loose, whether there was a possibility that any other supports were loose, and whether the licensee had a program for verifying torque values on supports and determining operability. The licensee is researching these questions. The status of a program for verifying support operability is an unresolved item (298/8823-01) pending licensee response to the SRI's questions.

No violations or deviations were identified in this area.

6. Monthly Surveillance Observations (61726)

The SRI observed and/or reviewed the performance of the following Surveillance Procedures (SPs):

- SP 6.3.3.1, "HPCI Test Mode Surveillance Operation," Revision 28, dated February 25, 1988: This surveillance was performed to verify operability of the High Pressure Coolant Injection (HPCI) system as required by TS. The SRI observed and reviewed the performance of this surveillance on July 13, 1988. The test was performed by qualified individuals who were cognizant of all precautions and limitations in the procedure. The SRI reviewed the completed procedure and verified that all test results were acceptable per the procedure and TS.
- SP 6.3.3.2, "HPCI Motor Operated Valve Operability Test," Revision 19, dated September 18, 1987: This surveillance was performed to verify timing after packing adjustments on HPCI-16. The SRI observed the performance of this test on July 13, 1988, and subsequently reviewed the performance package. The test was performed by qualified individuals in accordance with the procedure. The procedure was reviewed by all required personnel including the inservice testing engineer.
- SP 6.3.6.1, "RCIC Test Mode Surveillance Operation," Revision 18, dated December 17, 1987: This surveillance was performed on July 20, 1988, to verify operability of the Reactor Core Isolation Cooling (RCIC) system as required by TS. The SRI reviewed this surveillance and verified that test results were acceptable. The SRI observed the use of this procedure to troubleshoot and repair a cooling water valve which had not performed acceptably during the performance of the surveillance. The cooling water valve did not affect system operability or acceptance criteria of the surveillance. SP 6.3.6.1 was utilized properly by qualified operators to recreate initial conditions of the cooling water valve failure, and to verify operability after repair.
- SP 6.3.19.1, "SGT Operability Test/Off-Gas Flow Monitor Functional Test," Revision 20, dated May 17, 1988: This surveillance was performed to meet TS requirements that the system be operated with heaters on at least 10 hours every month. The SRI observed portions of this surveillance on July 26, 1988. The surveillance was performed by a trainee under the direct supervision of a licensed operator. The test was performed in accordance with the procedure. The licensed operator directed the performance of each step of the procedure and explained to the trainee the purpose of each step, and what indications to expect.

No violations or deviations were identified in this area.

7. Monthly Maintenance Observation (62703)

On July 2, 1988, Residual Heat Removal (RHR) Pump 1B failed to start during the performance of Operating Procedure 2.2.69.3, "RHR Suppression Pool Cooling and Containment Spray." RHR Pump 1B was declared inoperable and MWR 88-300 was issued to investigate the failure. It was found that the "C" phase motor lead connection in the junction box, on the side of the motor, had failed and was open.

The RHR pump motor had been replaced in February 1988 due to an unrelated problem. Since installation the motor had been started 15 times and had operated approximately 630 hours prior to the failure. Investigation of the failure revealed that during installation of the new motor, the "C" phase motor lead lug had been determined to be defective and had been replaced. The lug was replaced with a lug which was the wrong size for the motor wire. The licensee postulated that the oversized lug represented an electrical resistance in the motor circuit which dissipated energy in the form of heat. This thermal stress caused degradation of the connection which then failed completely due to the high motor starting current. The SRI examined the failed lug, the lugs which came installed with the motor, and samples of the motor wire which came with the motor. These examinations demonstrated the difficulty in determining the correct size lug to be used. The SRI concurs with the licensee's postulated failure mechanism, and believes the error in lug size selection to be an isolated occurrence. The licensee will document any corrective action taken in Nonconformance Report 88-165.

On July 15, 1988, electrical arcing occurred in the main generator, Phase "A", outlet bus ducting. The SRI observed maintenance personnel disassemble and inspect the bus ducting. The SRI verified that proper isolation was performed prior to work. A fire watch was properly posted after the bus was deenergized to watch for reflash. The arcing was determined to be caused by excessive circulating current induced in the bus covers. A current path was provided when the gasket between the permanent and removable bus covers became dislocated, allowing the top removable cover to drop down and make electrical contact with the permanent bus cover. The resulting current flow produced excessive heating of the two top ground straps and ignited the cork gasket. Maintenance personnel replaced all gaskets on the removable bus cover and broken ground straps. The remaining ground straps and gaskets on the removable covers for the other phases were inspected.

On July 23, 1988, operators noted increasing current on the movable screens in the circulating water bays. Divers inspected Bays A and B and determined that there was a large silt buildup inhibiting screen movement causing the increased current. The silt was subsequently pumped out of Bays A and B. The SRI monitored the pumping operation by maintenance

personnel. The licensee is planning to pump out silt that may have built up in the other bays in the near future.

No violations or deviations were identified in this area.

8. Radiological Protection Observations (71709)

The SRI verified that selected activities of the licensee's radiological protection program were implemented in conformance with facility policies, procedures, and regulatory requirements. Radiation work permits contained appropriate information to ensure that work could be performed in a safe and controlled manner. Radiation and/or contaminated areas were properly posted and controlled. Radiation monitors were utilized to check for contamination.

No violations or deviations were identified in this area.

9. Security (71881)

The SRI observed security personnel perform their duties of vehicle, personnel, and package search. Vehicles were properly authorized and controlled or escorted in the protected area (PA). The licensee continued implementation of the security equipment upgrade during this inspection period. The SRI conducted site tours to ensure that compensatory measures were properly implemented as required because of equipment failure or the security upgrade. Interviews with security personnel demonstrated that they were cognizant of their responsibilities. The PA barrier had adequate illumination and the isolation zones were free of transient material.

No violations or deviations were identified in this area.

10. Unresolved Item (92701)

An unresolved item is one about which additional information is required in order to determine if it is acceptable, a deviation, or a violation. There is one unresolved item in this report.

<u>Paragraph</u>	<u>Item No.</u>	<u>Subject</u>
5	298/8823-01	Program for Inspection of Supports

11. Exit Interview (30703)

An exit interview was conducted on July 28, 1988, with licensee representatives (identified in paragraph 1). During this interview, the SRI reviewed the scope and findings of the inspection. Other meetings between the SRI and licensee management were held periodically during the inspection period to discuss identified concerns.