APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-298/86-23 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: August 1-31, 1986

Inspectors: E. A. Plettner 9-11-86
E. A. Plettner, Resident Inspector, (RI) Date

for D. L. DuBois, Senior Resident Inspector, (SRI) 9/18/86
Date

Approved: 9/18/86
C. P. Jaudon, Chief, Project Section A, Date
Reactor Project Branch

Inspection Summary

Inspection Conducted August 1-31, 1986 (Report 50-298/86-23)

Areas Inspected: Routine, unannounced inspection of plant trips - safety system challenges, spent fuel shipments, operational safety verification, and monthly surveillance and maintenance activities.

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

DETAILS

1. Persons Contacted

Principal Licensee Employees

*G. R. Horn, Division Manager of Nuclear Operations
*J. M. Meacham, Technical Manager
*C. R. Goings, Regulatory Compliance Specialist
*F. Alderman, Fire Chief
*R. Beilke, Chemistry & Health Physics Supervisor
*S. Woerth, "Acting" Technical Staff Manager
*H. T. Hitch, Plant Services Manager

The NRC inspectors also interviewed other licensee employees during the course of the inspection.

*Denotes those present during exit interview September 3, 1986.

2. Plant Trips - Safety System Challenges

The NRC inspectors held discussions with operations shift personnel and reviewed control room records including log entries, recorder traces, and computer printouts associated with an unscheduled reactor scram that occurred on August 13, 1986, at 1:20 p.m. The reactor was at 90 percent of rated power and in steady state operating conditions prior to the scram.

On August 13, 1986, Main Steam Line High Radiation Relay 5A-K7A, was being replaced in accordance with Maintenance Work Request (MWR) 86-3059. Relay 5A-K7A, located in Reactor Protection System (RPS) Channel "A", had previously failed to actuate Annunciator 9-5-2/3-3, "Main Steam Line High-High Radiation Trip," during the conduct of Surveillance Procedure 6.1.4, "Main Steam Line Process Radiation Monitor Calibration and Functional/Functional Test," Revision 32, dated July 10, 1986. A half scram and half Group 1 isolation was inserted in RPS Channel "A" as required by the CNS Technical Specifications during that maintenance activity. While disconnecting the relay coil power supply lead from the relay terminal board, intermittent arcing occurred; this generated radio interference which caused an RPS Channel "B" Main Steam Line High-High Radiation Trip. The simultaneous presence of both RPS Channel "A" and "B" trips caused a full reactor scram and full Group 1 isolation. As a result of the rapid closure of the Main Steam Isolation Valves (MSIV), Groups 2, 3, 6, and 7 isolations also occurred. Safety-relief valves actuated to maintain reactor pressure. The High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems pumps started and restored reactor water level to normal. The standby gas treatment system started on the Group 6 isolation. Both emergency diesel generators automatically started but were not required to supply power to their respective vital, 4160V AC

busses because of the successful transfer of those busses to the emergency transformer. No other safety systems were required to operate. The licensee made notification of the event to the NRC.

Following the scram, the plant operators opened the MSIVs and established reactor water level control using the RCIC pump and pressure control using the main steam bypass system. The plant was cooled down to approximately 350°F, and miscellaneous maintenance was performed. The reactor was restarted on August 14, 1986, and the main turbine was loaded on August 15, 1986.

The licensee subsequently confirmed that the cause of the RPS Channel "B" Main Steam Line High-High Radiation Trip was the production of radio frequency energy caused by the intermittent arcing which occurred while disconnecting relay 5A-K7A. That energy was transmitted to the remaining main steam line radiation monitors electronic drawers that were located in the immediate vicinity.

The NRC inspectors attended several licensee Safety Operations Review Committee (SORC) Meetings. Those meetings provided assurance that the licensee had thoroughly reviewed the scram and that those reviews indicated that plant startup could be authorized.

The NRC inspectors observed the licensee's performance of the following procedures:

- GOP 2.0.5, "Shift Communicators Responsibility," Revision 1, dated February 13, 1986
- GOP 2.1.2, Attachment A, "Scram Recovery Checklist," Revision 25, dated April 24, 1986
- GOP 2.1.4, "Normal Shutdown from Power," Revision 24, dated June 19, 1986
- GOP 2.1.5, "Emergency Shutdown from Power," Revision 7, dated March 27, 1986
- EOP No. 1, "Reactor Pressure Vessel (RPV) Controls," Revision 2, dated April 4, 1986
- EOP No. 2, "Primary Containment Control," Revision 2, dated April 4, 1986
- Scram Report No. 86-02, dated August 13, 1986

The inspections, reviews, discussions, and observations were conducted to verify that: the plant responded as designed; plant personnel performed immediate and followup corrective actions; and there were no unreviewed safety questions. Also, the NRC inspectors verified that facility operations were in conformance with the requirements established in the CNS Operating License and Technical Specifications.

No violations or deviations were identified in this area.

3. Spent Fuel Shipments

The NRC inspectors inspected the licensee's activities associated with two shipments of spent fuel from CNS. Included in those inspections were observations and reviews of applicable procedures, documentation, surveys, inspections, and shipping document preparation.

The NRC inspectors verified by review of licensee documentation, through discussions with responsible personnel, and by independent inspection that the licensee completed the following:

- Receiving inspection of railcars and shipping casks
- Shipping documents
- Advance notification of and approval by affected state and federal agencies
- Proper placarding of the transport vehicles
- Appropriate labeling of the spent fuel shipping casks
- Establishment of provisions for response by escorts and local law enforcement agencies
- Training of escort personnel
- Testing of communications systems
- Continual manning of the licensee's communications center (Movement Control)
- Testing of fuel and cask handling cranes, hoists, and tools
- Proper loading and sealing of the spent fuel shipping casks
- Surveillance of area radiation monitors, ventilation systems, and spent fuel pool water level and chemistry
- Update of fuel location and accountability records
- Applicable quality assurance audits and inspections
- U.S. Department of Energy and U.S. NRC, "Nuclear Material Transaction Report," DOE/NRC Form 741
- Bill of Lading
- CNS Health Physics Procedure 9.5.3.7, "Cask IF-300 Shipment," Revision 3, dated December 26, 1985

- CNS Nuclear Performance Procedure 10.27, "Cask IF-300 Handling and Shipping," Revision 6, dated July 17, 1986
- CNS HP-138, "Contamination Survey - Sample Count Data Sheets"
- CNS HP-141, "Contamination Survey - Railroad Car for IF-300 Irradiated Fuel Shipping Cask"
- CNS HP-142, "Contamination Survey of IF-300 Shipping Casks"
- CNS HP-143, "Radiation Survey of IF-300 Shipping Cask"
- CNS HP-608, "Spent Fuel Shipment Checkoff Sheet and Certificate of Compliance of Number 9001 Conditions for Shipping Spent Fuel"
- CNS HP-14a, "Radioactive Material Shipment Record"

The following independent radiation and contamination surveys were performed by the NRC inspectors and verified to be satisfactory:

- Contact radiation surveys of the shipping casks
- Radiation surveys at a distance of two meters from the cask transport vehicles
- Contamination surveys of the shipping casks surfaces
- Contamination surveys of the cask transport vehicles

The spent fuel shipments left the CNS on August 6 and 26, 1986. Each shipment consisted of 2 spent fuel shipping casks, each of which contained 18 spent fuel bundles. The shipments were transported to the G.E. Morris Operation Complex, Morris, Illinois. The spent fuel casks identification numbers were:

- Shipment No. 1 - Casks IF-301 and IF-302
- Shipment No. 2 - Casks IF-301 and IF-302

The observations, reviews, and independent measurements were conducted to verify that spent fuel handling and shipment operations were in conformance with the requirements established in the CNS Operating License and Technical Specification.

No violations or deviations were identified in this area.

4. Operational Safety Verification

The NRC inspectors observed control room operations, instrumentation, controls, reviewed plant logs and records, conducted discussions with control room personnel, and performed system walk-downs to verify that:

- Minimum shift manning requirements were met.
- Technical Specification requirements were observed.
- Plant operations were conducted using approved procedures.
- Plant logs and records were complete, accurate, and indicative of actual system conditions and configurations.
- System pumps, valves, control switches, and power supply breakers were properly aligned.
- Licensee systems lineup procedures/checklists, plant drawings, and as-built configurations were in agreement.
- Instrumentation was accurately displaying process variables and protection system status to be within permissible operational limits for operation.
- When plant equipment was found to be inoperable or when equipment was removed from service for maintenance, it was properly identified and redundant equipment was verified to be operable. Also, the NRC inspectors verified that applicable limiting conditions for operation were identified and maintained.
- Equipment safety clearance records were complete and indicated that affected components were removed from and returned to service in a correct and approved manner.
- Maintenance work requests were initiated for equipment discovered to require repair or routine preventive upkeep, appropriate priority was assigned, and work commenced in a timely manner.
- Plant equipment conditions such as cleanliness, leakage, lubrication, and cooling water were controlled and adequately maintained.
- Areas of the plant were clean, unobstructed, and free of fire hazards. Fire suppression systems and emergency equipment were maintained in a condition of readiness.
- Security measures and radiological controls were adequate.

The NRC inspectors performed a lineup verification of the following systems:

- Residual Heat Removal (RHR) "A" Loop
- Emergency Power

The NRC inspectors witnessed a reactor startup and heatup on August 14-15, 1986. The reactor achieved criticality at 8:16 p.m., on August 14, 1986,

and the main generator was loaded at 8:10 a.m. on August 15, 1986. Those activities followed the plant trip discussed in paragraph 2 of this report. The following areas were observed or verified prior to, during, and following that startup:

- Operable status of required systems
- Completion of required surveillance tests
- Crew shift manning
- Usage of and adherence to approved procedures
- Reactor instrumentation response
- Management authorization for startup

The NRC inspectors observed performance of the following plant procedures:

- OP 2.0.6, "Reactor Post Trip Review and Restart Authorization Procedure," Revision 2, dated April 10, 1986
- GOP 2.1.1.1, "Reactor Startup Review," Revision 0, dated May 29, 1986
- GOP 2.1.1.2, "Technical Specifications Pre-Startup Checks," Revision 6, dated August 8, 1985
- GOP 2.1.2, "Hot Startup Procedure," Revision 25, dated April 24, 1986
- GOP 2.1.3, "Approach to Critical," Revision 10, dated March 27, 1986
- GOP 2.1.10, "Station Power Changes," Revision 11, dated July 24, 1986
- SOP 2.2.14, "22 KV Electrical System," Revision 23, dated May 15, 1986
- SOP 2.2.28, "Feedwater System," Revision 39, dated July 17, 1986
- SOP 2.2.56, "Main Steam and Turbine Bypass System," Revision 21, dated August 7, 1986
- SOP 2.2.77, "Turbine Generator," Revision 26, dated March 13, 1986
- SOP 2.2.55, "Main Condensor Gas Removal System," Revision 18, dated March 27, 1986

The tours, reviews, and observations were conducted to verify that facility operations were performed in accordance with the requirements established in the CNS Operating License and Technical Specification.

No violations or deviations were identified in this area.

5. Monthly Surveillance Observations

The NRC inspectors observed Technical Specification required surveillance tests. Those observations verified that:

- Tests were accomplished by qualified personnel in accordance with approved procedures.
- Procedures conformed to Technical Specification requirements.
- Tests prerequisites were completed including conformance with applicable limiting conditions for operation, required administrative approval, and availability of calibrated test equipment.
- Test data was reviewed for completeness, accuracy, and conformance with established criteria and Technical Specification requirements.
- Deficiencies were corrected in a timely manner.
- The system was returned to service.

The NRC inspectors observed the licensee's performance of the following surveillance tests on the indicated dates:

- August 4, 1986, SP 6.3.12.1, "Diesel Generator Operability Test," Revision 17, dated March 6, 1986
- August 11, 1986, SP 6.4.9.1, "RMA System Calibration and Functional/Function Test," Revision 25, dated June 19, 1986
- August 11, 1986, SP 6.1.14 (N), "North SDV High Water Level Switches and Transmitters Functional Test," Revision 15, dated October 8, 1984
- August 14-15, 1986, SP 6.2.2.2.3, "ADS Timer Calibration and Actuation Functional/Functional Test," Revision 19, dated January 30, 1986
- SP 6.2.2.3.9P, "HPCI Auto Isolation Logic Steam Line Space Temperature Functional test," Revision 17, dated June 19, 1986
- SP 6.3.3.1, "HPCI Test Mode Surveillance Operation," Revision 24, August 7, 1986
- SP 6.3.3.2, "HPCI Motor Operated Valve Operability Test," Revision 13, June 15, 1986
- SP 6.3.6.1, "RCIC Test Mode Surveillance Operation," Revision 15, November 21, 1985
- SP 6.3.12.1, "Diesel Generator Operability Test," Revision 17, dated March 6, 1986

. SP 6.1.26, "Rod Sequence Control System Functional Test for Startup," Revision 11, dated October 27, 1983

The reviews and observations were conducted to verify that facility surveillance operations were performed in accordance with the requirements established in the CNS Operating License and Technical Specification.

No violations or deviations were identified in this area.

6. Monthly Maintenance Observation

The NRC inspectors observed preventive and corrective maintenance activities. These observations verified that:

. Limiting conditions for operation were met.

. Redundant equipment was operable.

. Equipment was adequately isolated and safety tagged.

. Appropriate administrative approvals were obtained prior to commencement of work activities.

. Work was performed by qualified personnel in accordance with approved procedures.

. Radiological controls, cleanliness practices, and appropriate fire prevention precautions were implemented and maintained.

. Quality control checks and postmaintenance surveillance testing were performed as required.

. Equipment was properly returned to service.

These reviews and observations were conducted to verify that facility maintenance operations were performed in accordance with the requirements established in the CNS Operating License and Technical Specification.

No violations or deviations were identified in this area.

7. Exit Meetings

Exit meetings were conducted at the conclusion of each portion of the inspection. The NRC inspectors summarized the scope and findings of each inspection segment at those meetings.