ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-298/96-07

License: DPR-46

Licensee: Nebraska Public Power District
1414 15th Street
Columbus, Nebraska

Facility Name: Cooper Nuclear Station

Inspection At: Brownville, Nebraska

Inspection Conducted: March 17 through May 4, 1996

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Inspection Summary

Areas Inspected: Routine, announced inspection of operational safety verification, surveillance and maintenance observations, engineering, plant support activities, followup of corrective actions for violations, followup of licensee event reports, and updated safety analysis report (USAR) review.

Results:

Operations

- The reactor building operator rounds were found to be adequate, the operator very knowledgeable, but several items were not identified during the rounds, such as combustibles stored in a nonstorage area (Section 2.2).

- Shift supervisor and control room supervisor turnovers were strong, containing detailed information on current and expected plant conditions (Section 2.1).

- An emergency diesel generator was returned to operable status in an abnormal configuration without testing or analysis. Portions of the

exhaust path piping were suspended from chain falls and an essential valve was removed. Operators did not question this condition (Section 3.3).

- Efforts to identify the source of a fuel leak and actions to suppress power levels around the leak were conducted in a well-controlled conservative manner. Involvement and coordination were excellent among engineering, operations, chemistry, and radiation protection (Section 2.5).

- Inspectors noted that primary system boundary local leak rate testing connections with standard Chicago-type air fittings may be a human factors risk in control of primary containment boundaries (Section 2.4).

Maintenance/Surveillance

- Maintenance personnel did not provide sufficient detail to operations to ensure that a clearance order was adequate for the planned maintenance (Section 3.4).

- A Quality Assurance evaluation of battery room ventilation maintenance activities was intrusive, appropriate in safety focus, and thoroughly evaluated issues (Section 3.6).

- Maintenance personnel did not follow a procedural step to open the suction valve for the turbine building high radiation monitor after returning it to operable status. This is an unresolved item (Section 4.4).

- Inspectors found ineffective implementation of corrective actions for a previous violation of inadequate 10 CFR Part 50, Appendix J, testing (Section 7.2).

- A licensed operator did not follow the control rod exercise surveillance procedure and inserted the wrong control rod prior to having the second checker verify the correct control rod had been selected. This is a noncited violation (Section 4.3).

- A high pressure core injection surveillance test, oil pressure setpoint adjustment, recirculation flow unit surveillance, and maintenance on an air system valve were performed appropriately (Sections 3.1, 3.2, and 4.5).

Engineering

- The licensee used engineering judgement rather than a design basis evaluation for emergency core cooling system keep fill system pressure setpoints. The inspectors identified that a reactor core isolation

cooling suction relief valve was partially lifted under normal system conditions. An inspector followup item was opened (Section 2.3).

- An on-the-spot change to a design modification package inappropriately modified the emergency diesel generator. An incorrect step allowed the operators to declare the diesel operable in a condition that was not evaluated. This is a violation (Section 3.3).

- Engineering analysis and troubleshooting of a stuck closed valve in a scram discharge volume level instrument line was prompt and conservative (Section 3.5).

- A degraded bypass muffler valve in the emergency diesel generator exhaust path was not properly evaluated and corrected in a timely fashion. A quality assurance audit identified this issue concurrent with inspection activities. This is a noncited violation for untimely corrective action (Section 4.1).

- Inspectors identified undocumented modifications associated with the control room seismic monitor/recorder. This will be followed with corrective action for Violation 298/9604-01 (Section 5).

- NRC headquarters review of USAR spent fuel pool evaluations identified concerns regarding refueling practices and safety analysis report update timeliness. An unresolved item was updated.

Plant Support

- The inspectors observed two emergency preparedness drills. The first resulted in identification of several items. The second evidenced a strong drill performance by the technical support center staff (Section 6.1).

Summary of Inspection Findings:

Open Items

- Inspector Followup Item 298/9607-01 (Section 2.3)
- Violation 298/9607-02 (Section 3.3)
- Unresolved Item 298/9607-05 (Section 4.4)
- Inspector Followup Item 298/9607-06 (Section 7.2)

Updated

- Violation 298/9604-01 (Section 5)
- Violation 298/9419-01 (Section 8.3)
- Unresolved Item 298/9514-01 (Section 7.3)
- Violation 298/9414-06 (Section 7.2)

Closed Items

- Licensee Event Report (LER) 298/93-019, Revision 0 (Section 8.1)
- LER 298/93-027, Revision 1 (Section 8.2)
- LER 298/94-014, Revision 0 (Section 8.3)
- Violation 298/93202-16 (Section 7.1)
- Noncited Violation 298/9607-03 (Section 4.1)
- Noncited Violation 298/9607-04 (Section 4.3)

Attachment:

- Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

During this period the reactor operated at full power, with the exception of routine surveillance testing and power suppression testing for leaking fuel. The licensee identified the fuel leak as a result of increased radiation levels in the condenser off-gas system. Testing was performed and the leaking fuel was identified and suppressed.

2 OPERATIONAL SAFETY VERIFICATION (71707)

2.1 Control Room Observations

During multiple observations of control room turnovers, the inspectors noted that shift supervisor and crew member turnovers were good, including detailed information of plant activities and safety risks. Crew coordination to perform both scheduled and unscheduled activities was strong. The control room supervisor knowledge of plant activities was excellent. Inspectors noted a generally conservative approach to command and control of safety-related maintenance and surveillance activities.

2.2 Operator Rounds Observations

On March 20, 1996, the inspectors toured the reactor building with the reactor building station operator. The station operator appeared knowledgeable and to be following Procedure 2.1.11, "Station Operators Tour," Revision 70.1. The inspectors observed that the station operator did not question items stored in areas not designated as storage areas. For example, the inspectors pointed out combustibles stored in a noncombustible storage area and ladders that were not secured nor stored in a designated storage area. The station operator immediately took action to correct the concerns.

2.3 Plant Tours

During routine inspection tours of engineered safety feature and safety systems, inspectors noted that the reactor core isolation cooling system suction relief valve was leaking. Inspectors questioned the relief valve setpoint relative to the keep-fill system pressure and possible dynamic effects on the emergency core cooling system if the relief valve was open. The licensee determined that the relief valve setpoint was close to the pressure under normal standby system conditions and, consequently, the relief valve was partially lifting. Under design basis accident conditions, this valve could allow high activity water to be directed to radwaste floor drains. The licensee stated that they planned to evaluate the safety consequence of this condition and review the emergency core cooling system relief valve setpoints relative to the keep-fill system pressures. The emergency core

cooling system keep-fill system pressure setpoint basis was not documented and was based on engineering judgement. Resolution of the above concerns will be followed by Inspector Followup Item 298/9607-01.

2.4 Potential Human Factors Concerns for Primary Containment Boundary Local Leak Rate Testing Connections

During routine tours, the inspectors identified that the ends of local leak rate test connections to piping between primary containment isolation valves were not capped, but were left open with standard Chicago-type air fittings attached. The valves in the local leak rate testing line were not sealed. To avoid inadvertent operation, the licensee placed yellow tags labeled "Primary Containment Boundary" on the valves. This configuration is documented in the licensee's design drawings, and the lack of valve seals is in accordance with the licensee's valve control procedures.

The inspectors noted that the licensee appeared to be in compliance with commitments and requirements. However, the placement of two unsealed valves on a line with open, standard Chicago-type air fittings, of standard service air piping size, made the configuration appear very similar to service air connections. The only human factors barriers to protect the integrity of primary containment if a worker connected an air hose to the fitting were valve labels.

The licensee stated that this configuration is typical of other reactor plants and that existing valve controls are adequate. The licensee also indicated that no human factors problems had been experienced to date with these fittings and controls for local leak rate testing connections.

2.5 Leaking Fuel Assembly

On March 30, 1996, the licensee identified a fuel leak through increased radiation levels in the condenser off-gas system. Testing in accordance with vendor recommendations was performed, and the fuel leak was identified and suppressed. Actions to suppress power levels around the leak were conducted in a well-controlled, conservative manner. Involvement and coordination among engineering, operations, chemistry, and radiation protection organizations was excellent.

3 MAINTENANCE OBSERVATIONS (62703)

3.1 High Pressure Coolant Injection Turbine Exhaust to Suppression Pool Isolation Valve Inspection

On April 10, 1996, the inspectors observed the ASME Section XI inspection of high pressure coolant injection Valve-V-44, turbine exhaust to suppression pool isolation check valve, and portions of the high pressure coolant injection lube oil pressure adjustments. Maintenance technicians were knowledgeable of procedural and inspection requirements, and documentation of the work orders were performed appropriately.

3.2 Service Air Valve AOV-20 Repair

The inspectors observed portions of repairs of the Service Air Valve AOV-20 System A to System B crosstie. The inspectors observed that Clearance Order 96-000373 dated April 4, 1996, was appropriately hung and clearance points selected to isolate the valve, while providing minimal interference with the instrument air and service air systems. Inspectors observed that, although some valve leakage occurred at clearance points, maintenance technicians observed appropriate safety precautions, contacted engineering, and identified and performed required actions to ensure valve problems were corrected. During the maintenance the licensee found that the valve disc had become worn. The corrective maintenance appeared appropriate.

3.3 Diesel Generator 2 Inappropriately Declared Operable

On March 15, 1996, the inspectors identified that Diesel Generator 2 had been declared operable while in an abnormal configuration. The muffler bypass valve was removed, and the exhaust piping was supported by chain falls. Diesel Generator 2 remained in this condition for approximately 8 hours. The inspectors questioned whether an operability evaluation or test had been performed which demonstrated the diesel generator would operate as designed while in this configuration. Engineering stated that no documentation or testing was necessary and that the diesel generator was operable based on engineering judgement.

The licensee noted that the work instructions stated that the control room could exit the Technical Specification action statement and declare the diesel generator operable. Design Change 93-024, Step 6.4.6.39, stated that with the muffler bypass valve removed the diesel generator was available and that the shift supervisor could exit the Technical Specification action statement. Inspectors found that no postmaintenance or surveillance testing had been performed prior to declaring the diesel generator operable in the abnormal configuration. The basis for diesel generator operability was only the direction of Step 6.4.6.39.

After several discussions with inspectors, on March 19 the licensee determined that the diesel generator should not have been declared operable and included in the total length of time that the diesel generator was inoperable the 8 hours that the diesel generator had been declared operable in error. The total length of time that the diesel generator was inoperable did not exceed the Technical Specification 7-day action statement. The licensee determined that the actual safety consequence of this condition was low, since only the earthquake design aspects were affected by the configuration.

The licensee identified two causes for inappropriately declaring the diesel generator operable. First, the operations staff failed to question instructions regarding return of equipment to an operable status without testing or an operability evaluation while in an abnormal configuration. Procedures did not require operators to question the basis for operability associated with design changes. Design Change 93-024, Step 6.4.6.39 stated

that with the muffler bypass valve removed the diesel generator was available and that the shift supervisor could exit the Technical Specification action statement. The step was intended to state that the diesel generator was now available and the shift supervisor could remove the clearance order.

Second, licensee personnel misused the on-the-spot change process. The step which allowed operators to declare the diesel generator operable and the instructions for the modification were implemented to an existing design change package using the on-the-spot change process. On-the-spot changes do not apply to changes of intent. In this event, the scope of the modification was changed to include enlarged air tubing and to change the muffler bypass valve orientation by rotating it 90 degrees. The use of the change-of-intent process did not provide the necessary controls for this change to Design Change 93-024.

The licensee's corrective actions included reenforcing with engineers the need to provide clear guidance regarding the operability of equipment and to provide training for the proper use of the on-the-spot change process for design change packages. Also, actions will be taken to provide clear instructions to control room staff regarding a questioning attitude toward the control and basis for equipment operability.

The use of an on-the-spot change was contrary to Procedure 3.4.10, "Station Modification Changes," Revision 4.2. Step 2.1.1.1 specifies that any change to a station modification package which results in a change to the design basis or design criteria is considered a change of intent and cannot be an on-the-spot change. On-The-Spot Change 61 to Design Modification 93-024 changed the size of an air tubing and the muffler valve orientation. Also, this change resulted in incorrect instructions to plant operators. Step 6.4.6.39 of Design Change 93-024 allowed the control room staff to exit the Technical Specification action statement while the diesel generator was in a configuration for which it was not analyzed or tested. This is a violation of 10 CFR Part 50, Appendix B, Criteria V, which requires procedures appropriate to the circumstances to be developed and properly implemented (298/9607-02).

3.4 Incorrect Clearance Order for Diesel Generator Maintenance

On March 11, 1996, during the diesel generator muffler bypass valve work, after Clearance Order 96-000259 was verified by operations, the maintenance crew began work and recognized that work could not continue because the muffler bypass valve was in the wrong position to allow maintenance. The inspectors verified that the clearance had been performed as written. Operations was informed and modified the clearance order, so the valve would be maintained in the closed position during the maintenance activity.

No further action was taken until 2 days later when, after questioning by the inspectors, the licensee initiated a condition report to address the root cause of the clearance order error and to develop corrective actions. The

safety consequence of this event was minimal based on the fact that no damage was done to plant equipment. There was potential personnel safety impact which was averted by the technicians.

The inspectors concluded that the cause of this occurrence appeared to be a miscommunication between maintenance and operations in that the maintenance technicians did not inform the work control center of the valve position needed for the maintenance to be performed.

3.5 Scram Discharge Volume Level Isolation Valve Inoperable

On March 23, 1996, during performance of Surveillance Procedure 6.1RPS.310, South Scram Discharge Volume Level Indication, the licensee identified that an instrumentation isolation valve was stuck shut after attempts to perform the surveillance resulted in an unexpected half-scram. The licensee declared the level indicator inoperable and identified that 15 isolation valves of similar design were installed in the scram discharge volume level indication system. The licensee tripped the channel associated with the affected level indication instrument. This action, although not required by the licensee's Technical Specifications, was based on the licensee's evaluation of the 1980 generic issue concerning scram discharge volume redundancy and the guidance of NUREG 1443, "Improved Standard Technical Specifications for BWR-4 Design." The licensee plans to implement the guidelines of NUREG 1443 in the future and found the actions to trip the channel associated with the failed level instrument to be prudent. This action was conservative, since Cooper Technical Specifications required only 3 of 4 level indications to be operable, and this was the fourth indication.

The licensee performed special instructions approved by the Station Operations Review Committee to determine the position of other similar valves in the system and found that no additional valves were stuck in the closed position. The licensee determined that the original valve of concern was stuck shut and freed it by tapping the valve with a brass tool. The valve was degraded in that it was difficult to close. The licensee plans to replace the valve.

The licensee determined that this condition would have resulted in failure of that instrument to sense high level in the scram discharge. The safety consequence of this vulnerability was low since only one valve was susceptible to sticking in the closed position. Redundant channels and redundant instrumentation would have fulfilled the safety function. For the affected valve, the licensee planned to verify that it returns to the open position after being closed for surveillance testing. Also, the licensee planned to evaluate the need to communicate this operational experience to the industry. The inspectors concluded that the licensee actions in response to this occurrence were timely and conservative.

3.6 Battery Room Ventilation Fan Maintenance

On April 19, 1996, the control room received a low flow alarm for Battery Room Ventilation Fan EF-C-1C. The shift supervisor declared the fan inoperable and

initiated troubleshooting activities. The licensee found that Differential Pressure Switch AV-DPS-10B was erratic.

The switch was replaced and tested under Maintenance Work Request 96-0684 and the system was declared operable. Another low flow alarm was received approximately 1.5 hours later. Again, troubleshooting activities were performed and determined that a damper was partially closed, causing the flow to be unbalanced between Battery Rooms 1A and 1B. Maintenance Work Request 96-0688 was performed to correct the damper position. The licensee was unable to determine when and how the damper had changed position. Quality Assurance performed an evaluation on this maintenance activity and documented the following problems in Audit QE96162.

Inspectors reviewed the evaluation and found that it was prompt, intrusive, appropriate in safety focus, and addressed issues in a conservative manner.

4 SURVEILLANCE OBSERVATIONS (61726)

4.1 Surveillance of Diesel Generator Muffler Bypass Valve

Both diesel generators are provided with a safety-related valve in the diesel exhaust piping which bypasses the exhaust muffler since the muffler is not qualified under some environmental circumstances. The valve is air-operated, controlled by a solenoid valve, and opens to a qualified exhaust path when high backpressure is detected. The muffler bypass valve on Diesel Generator 2 experienced several operational problems after modifications were installed in December 1995.

In January 1996, the licensee identified that the Diesel Generator 2 muffler bypass valve sometimes failed to change position due to a j-tube which restricted the solenoid valve air vent port. This issue is described and dispositioned by Violation 298/9604-02.

4.1.1 Failure to Address Valve Orientation Problem in Timely Manner

Operational problems with the muffler bypass valve were also experienced because of clogged drain lines, incorrect actuator settings, and incorrect valve orientation. These problems sometimes caused the muffler bypass valve to open only partially instead of fully.

The licensee had documented and evaluated partial valve travel on January 15, January 29, and February 13, 1996, by issuing three condition reports. The licensee considered the valve operable at a partially open position of 70 degrees. Repeatability of the partial valve travel position was not evaluated by the licensee.

During surveillance testing on February 13, the inspectors observed loud, slow, and rough muffler bypass valve operation to a partially open position. The valve took approximately 12 seconds to open and approximately 15 seconds to close. Inspectors questioned the licensee regarding the cause of the

abnormal valve operation. After these occurrences, the licensee formed an engineering team to address abnormal muffler bypass valve operation. The inspectors concluded that the licensee had not previously addressed the erratic muffler bypass valve operation in a timely and comprehensive manner.

4.1.2 Licensee Troubleshooting Activities

The licensee determined that the muffler bypass valve actuator adaptor was binding with the valve operator mounting bracket. On March 11, Maintenance Work Request 96-0350 was performed to correct the problem. The valve was tested and this time partially opened to only 60 degrees. The licensee placed both Diesel Generators 1 and 2 muffler bypass valves in their safety position (open) and continued analysis of the cause of the valve partial travel.

Licensee efforts then identified that the valve drain was clogged, resulting in corrosion products interfering with bearing motion, the actuator was misadjusted, and the valve axis was oriented vertically rather than horizontally as recommended and tested by the vendor, allowing interference and galling on the valve bearings during operation. Further, seismic testing had been performed in the horizontal orientation rather than vertical. The licensee evaluated the seismic margin and determined that the margin had been reduced, but not eliminated.

4.1.3 Licensee Quality Assurance Audit

The licensee quality assurance organization conducted an audit (96-07a) of the design control process and found, in addition to other findings, that the corrective action process failed to identify significant conditions adverse to quality in instances where repetitive deficiencies were identified, and failed to promptly identify a root cause that, if corrected, would preclude recurrence of conditions where design control was not properly applied (Condition Report 96-0364). One of the main examples of this finding was the failure to promptly address the partial travel of the diesel generator muffler bypass valve for approximately 2 years. This audit finding was identified independently of the similar NRC finding described above. The failure to promptly correct the muffler bypass valve partial travel is, therefore, licensee identified.

The degraded muffler bypass valve in the essential diesel generator exhaust path was not properly evaluated and corrected in a timely fashion in that surveillance testing on January 15, January 29, and February 13, 1996, evidenced degraded valve operation. However, effective corrective action was not initiated until after these tests. 10 CFR Part 50, Appendix B, Criterion XVI, states, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure the cause of the condition is determined and corrective actions taken to preclude repetition. This licensee identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.I of the NRC Enforcement Policy (298/9607-03).

4.2 Testing Motor-Operated Valves From the Alternate Shutdown Room

Alternate Shutdown Surveillance Procedure 6.3.3.2A, "HPCI Motor Operated Valve Operability Test from ASD-HPCI Panel," Revision 10, required by Technical Specification 3.2.I, addresses capability to perform a shutdown from the alternate shutdown room by operating isolation switches and performing equipment surveillance from the alternate shutdown room and verifying valve operation and indication in the alternate shutdown room. The test also checks that the valves cannot be operated from the control room while the isolation switch is actuated.

4.2.1 Verification of Valve Indication Light Isolation

The procedure required isolation of valve control be verified by turning the control room valve control toggle and noting that no valve movement occurred and flow indication in the control room was downscale. Inspectors noted that the test did not require that control room valve position indication lights (red and green) be observed to be off and, therefore, isolated.

Inspectors observed that the control room lights were not checked during the surveillance performance. Verification that control room indication lights were extinguished in the control room would provide assurance of valve circuit isolation. Inspectors questioned why isolation of these indications was not verified.

The licensee indicated that, while the indicating lights were not periodically verified, the valve control circuits were protected by coordinated fusing and the safety consequence of not periodically verifying indication lights was very low. The inspectors reviewed samples of motor-operated valve fusing coordination and found the fuse coordination adequately addressed the above issue.

4.2.2 Scope of Motor-Operated Valve Isolation Contact Testing

Inspectors also found that the licensee's testing methods did not verify operation of each isolation contact, but only verified that at least one contact in a circuit had opened to provide isolation. The 10 CFR Part 50, Appendix R, fire scenario assumes hot shorts and shorts to ground. The failure of a circuit to isolate could result in an unisolable short to ground on a power supply or unisolable valve demand signal to open or close the valve.

The licensee stated that protective fusing ensures the protection of alternate shutdown circuits and also stated the intent of surveillance testing requirements does not include verification that all switch isolation contacts work, but only that a reasonable validation of functionality occur. In addition, no single failures are assumed to occur during a fire, therefore no isolation switch failures should be assumed to fail. The licensee also stated that surveillance testing of all isolation contacts was not required because

NRC Generic Letter 96-01 applies in this case and does not require logic system functional testing of Appendix R isolation circuitry. Additionally, the failure rate of these contacts is low.

Inspectors concluded that the safety consequences were low and that the fusing was properly coordinated.

4.3 Control Rod Insertion Error

On April 10, 1996, the licensee modified Procedure 6.CRD.301, "Withdraw Control Rod Operability Test," to implement power suppression guidelines concerning leaking fuel. The procedure divided the control rods into two groups, the first group to be tested at full power and the second group to be tested at 90 percent power. Step 11 required that the control rods listed on Attachment 2 be exercised at a lower power (about 90 percent) as directed by reactor engineering. Control Rod 42-33 was listed on Attachment 2.

On April 13, 1996, while performing Procedure 6.CRD.301, at 95 percent power, a licensed operator inserted Control Rod 42-33 from Position 48 to 46 without waiting for the second checker to verify the control rod movement. As the second checker stated "wrong rod" the operator had already started rod motion.

The licensee initiated a condition report but classified it as a low priority condition report, only to be used to establish a trend. After discussions between the inspectors and operations management concerning the significance of reactivity management, the classification of the condition report was upgraded to determine the apparent cause of the error.

The licensee's preliminary root cause evaluation concluded that the operator relied on the core map and his sense of which rod was next to select the control rod, instead of following the procedure. As interim corrective actions, the licensee used this occurrence as a "lessons learned" discussion for operators and placed controlled operator aids (removable "dots") on the core map to help preclude exercising an incorrect control rod during full power operation.

The failure to perform Step 11 of Procedure 6.CRD.301 in that the operator did not wait for the second checker to verify the correct rod had been selected is a violation of Criterion V, which requires that procedures be implemented. This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B1 of the NRC Enforcement Policy (298/9607-04).

4.4 Turbine Building Radiation Monitor Inoperable After Maintenance

After calibration on April 10, 1996, the turbine building high range radiation monitor, which receives a start signal during accidents, was returned to operable status, and the Technical Specification action statement was exited. A routine operability check on April 14 resulted in a low flow alarm. Licensee investigation determined that the pump suction valve had been left

shut after the April 10 performance of Surveillance Procedure 6.4.6.4.1, "Turbine Building Kaman Monitor Calibration," Revision 5. Procedure 6.4.6.4.1, Step 8.10.2.4, directed opening the valve.

The licensee initiated Condition Report 96-0334 to determine the root cause and to implement corrective actions. The licensee stated that the safety consequence was minimal, because the control room would still receive a low flow alarm in the event the monitor was actuated. The alarm response procedure provided instructions to the operator concerning what compensatory actions to take and an alternate method to obtain required samples.

The failure to perform Step 8.10.2.4 of Procedure 6.4.6.4.1 is an unresolved item pending NRC review of the effectiveness of corrective actions (UNR 298/9607-05).

4.5 Reactor Recirculation Flow Unit Functional Test (Div 2)

On April 10, 1996, the inspectors monitored a functional test of Flow Unit NMF-FM-81B, performed under Surveillance Test Procedure 6.2RR.301, "Reactor Recirculation Flow Unit Functional Test (Div 2)."

The surveillance test procedure was found to be very detailed and prescriptive, but did not provide detailed instructions for using the instrumentation to take the appropriate measurements. The inspectors determined the operator was knowledgeable on the proper use of the instrumentation and on the purpose of the test.

The inspectors verified that the procedure had been reviewed and approved by appropriate signatures. The inspectors verified calibration dates and instrument calibration documentation. The appropriate Technical Specification action statement had been entered during the surveillance test, and the test was performed within its required frequency. During the test, communication between the control room and the field personnel was very good, as was internal control room communications regarding the surveillance activities. Overall, the test was generally well performed.

5 ONSITE ENGINEERING (37551)

Undocumented Modification of Control Room Seismic Monitor

During routine walkdowns of plant systems, the inspectors noted that the seismic monitor cabinet in the control room appeared to have been modified from its original design. Inspectors found metal shelves attached to the side of the seismic monitor panel and multiple electrical connections with the same power source as the seismic monitor. The licensee was unable to identify documentation for these additions to the seismic monitor panel. The seismic monitor and its function is described in USAR Volume II, Section 5. Also, the licensee could not determine that a 10 CFR 50.59 analysis to address the acceptability of these modifications to the seismic monitor had been

performed. The licensee concluded it was likely that these modifications were performed without appropriate evaluation or documentation.

The licensee determined that the safety consequence of these electrical and structural modifications was low since electrical and structural loading in the as-found condition did not appear to exceed design values.

This is an additional example of NRC Violation 298/9604-01, for which corrective actions have not been implemented. This finding will be evaluated during the closure review of that violation (update of Violation 298/9604-01).

6 PLANT SUPPORT ACTIVITIES (71750)

6.1 Observation of Licensee Emergency Drill

On March 19 and April 10, 1996, the inspectors observed licensee performance of an emergency drill. In both cases the scenario was challenging and licensee emergency planning staff monitored the licensee's performance. During the April 10 drill, the inspectors observed strong technical support center event response skills. The inspectors observed the following items in the licensee's March 19 drill performance:

- The operational support center supervisor demonstrated a high level of initiative to regroup when processes became unnecessarily cumbersome.
- The technical support center director demonstrated outstanding individual event response skills.
- The scenario did not have the reactor building roof panels blowout at the design pressure.
- No one in the structural engineering department was respirator qualified.
- The technical support center director did not announce technical support center habitability.
- For 1.5 hours no one in the control room referred to an alarm response procedure, although alarms occurred and response actions to those alarms were performed.
- No one updated the control room emergency core cooling system status panel.

The inspectors discussed the above drill observations with the licensee. The inspectors concluded that the observations by the licensee drill observers were critical and addressed many additional items of similar nature and

significance to those listed above. The licensee's emergency preparedness staff determined that this feedback will be used to enhance emergency response performance.

6.2 High Pressure Coolant Injection Pump Monthly Surveillance Health Physics Briefing

Prior to the performance of this activity, the licensee held a prejob briefing in the control room with all the personnel involved. The briefing addressed the activity in general terms, with only a few specific details. The most evident example was the radiation protection technician's discussion. He addressed which Special Work Permit would be used during this activity and identified the high dose areas, but did not discuss the contaminated areas in the overhead during the briefing, although work took place in the overhead. Inspectors later determined that technicians understood that overhead areas could be contaminated.

7 FOLLOWUP - VIOLATIONS (92903)

7.1 (Closed) Violation 50-298/93202-16: Procedures Were Not Appropriate to the Circumstances

Six examples of a single violation for procedures inappropriate to circumstances are discussed in the following paragraphs.

7.1.1 Housekeeping Requirements Not Implemented

The first example was that two procedures on sampling the standby liquid control and diesel generator fuel oil storage tanks did not have housekeeping requirements. The licensee determined that inattention to detail resulted in the procedure inadequacy. The applicable areas were immediately cleaned and the applicable procedures corrected by the licensee. In addition, the licensee reevaluated housekeeping commitments and reissued management directives to ensure proper housekeeping. The inspectors verified that the procedures were revised and management directives issued. In touring the site during this inspection, the inspectors found housekeeping to be very good.

The inspectors found that one of the procedures (diesel generator fuel oil storage tanks sampling) referenced in the NRC inspection report had not been revised. The licensee stated that the procedure which had been revised as corrective action to the violation (standby liquid control tank sampling), had also been expanded in scope to address all sampling activities. The inspectors noted this general sampling procedure was not referenced in the diesel fuel oil sampling procedure. The licensee issued Condition Report 1-23111 for the lack of reference of the general sampling procedure in the diesel fuel oil sampling procedure and initiated procedure change notices to provide the reference. The inspectors concluded that actions to implement overall housekeeping procedures after issuance of the violation appeared to have addressed the performance issue.

7.1.2 Inadequate Detail in Procedures

The second example was preventive maintenance tasks on diesel generator fuel oil transfer pumps and 24-Vdc battery chargers could not be performed as written because acceptance criteria, precautions, and limitations were missing. The licensee determined that a lack of detail resulted from an over-reliance on the skill of the craft and corrected the applicable maintenance tasks. A review of 258 maintenance procedures by the licensee established that approximately 85 percent were in need of additional detail. The licensee also developed a desk top reference manual and maintenance procedure template. The inspectors verified the use of the desk top instructions and procedure template. Interviews with 10 maintenance personnel by the inspectors found the staff felt comfortable with the amount of detail in procedures and two procedure reviewers were receiving informal feedback on procedures.

7.1.3 Lubrication Requirements for Preventative Maintenance

The third example dealt with a preventive maintenance task that allowed the combining of incompatible lubricants. The licensee concluded that the process of preventive maintenance instruction generation did not ensure an adequate review of lubrication criteria. The licensee revised the applicable preventive maintenance task to allow the use of an alternate lubricant and revised Procedure 7.0.2, "Work Item Tracking - Preventive Maintenance," to programmatically require that lubricants involved in preventive maintenance have been addressed for compatibility. The licensee reviewed all mechanical preventive maintenance requirements for the essential control building ventilation system to ensure all requirements were incorporated into preventive maintenance tasks. The inspectors verified the revision of the procedures and tasks mentioned above. In addition, the inspectors verified that a sample of lubricant requirements were properly included in preventive maintenance tasks.

7.1.4 Untimely Incorporation of Preventive Maintenance Requirements

The fourth example noted that a design change failed to establish a weekly preventive maintenance procedure requirement to cycle the installed dampers. The licensee concluded that the design control procedural requirements did not ensure timely incorporation of preventive maintenance requirements into preventive maintenance tasks and revised the surveillance procedure identified to incorporate requirements to cycle the dampers. The licensee also revised Procedure 3.4.11, "Status Reports," to provide instructions for timely submittal, review, and implementation of preventive maintenance requirements on safety-related equipment. The licensee reviewed open design changes to ensure that no similar deficiencies existed. This review by the licensee found 23 additional preventive maintenance tasks should be added to the program. The inspectors reviewed a sample of vendor manuals to identify preventive maintenance requirements and verified the inclusion of the preventive maintenance requirements into preventive maintenance tasks.

7.1.5 Two Valves Missing From Sampling Procedure Lineup

The fifth example was that a surveillance procedure for standby liquid control pump operability failed to include two valves required to be manipulated. The licensee agreed that the procedure was inadequate. The licensee revised the procedure. Management expectations on procedure adherence were stressed to the staff, which would identify additional examples of this problem. The inspectors verified the revision of the applicable procedure. The inspectors interviewed maintenance staff in regard to procedure completion and adherence and found the staff reported no problems with procedure adherence caused by the absence of information.

7.1.6 Inadequate Review For Temporary Modifications on Systems

The sixth example was that an administrative procedure on temporary modifications did not ensure the necessary reviews when a system was put back into service. The licensee agreed that there was a failure to recognize the necessary checks and balances when returning equipment with temporary modifications back to service. The licensee obtained the appropriate reviews for the temporary modifications found by the NRC inspectors. In addition, the licensee revised Procedure 2.0.7, "Plant Temporary Modification Control," to correct this problem. The inspectors reviewed the current temporary modification log and verified there were no additional examples of this problem. All temporary modifications had proper approvals.

7.2 (Open) Violation 298/9414-06: Failure to Test 68 Components and 15 Pressure Switches in Accordance With the Requirements of Technical Specifications Surveillance Requirement 4.7.A.2.f.1 "Leak Rate Testing"

As corrective action for this violation, a special test procedure was prepared and implemented from which a design basis testing document was prepared which identified the scope of components and testing requirements for primary containment. The requirements established in the design basis testing document were then verified by the licensee to clearly connect 10 CFR Part 50, Appendix J, requirements with testing.

Design Change 94-212J was prepared to identify all primary containment penetrations. The inspectors verified that penetrations listed in Design Change 94-212J, Attachment 11.1, were included in the Primary Containment Design Basis Testing Document. The inspectors identified that four valves (PC-V-320 and 321 and PC-V-323 and 324) were not included in the Primary Containment Design Basis Testing Document. These four valves were identified in the In-Service Inspection Boundary Basis ASME Section XI Classification Basis document, indicating that the valves should be subjected to leak rate testing and, therefore, should be included in the Primary Containment Design Basis Testing document. The licensee issued Condition Report 96-0351, which will ensure the document is updated with respect to this and other similar findings.

The valves in question had been tested and included in the implementing procedures. However, the design basis document written to provide a clear connection between Appendix J requirements and testing procedures and to correct testing omissions omitted four valves. Inspectors concluded that the design basis testing document did not provide a clear basis for testing for some systems. This violation will remain open pending NRC review of licensee corrective actions to the design basis testing document.

The inspectors found that the listing of testable primary containment isolation valves in USAR Table V-2-7, Testable Primary Containment Isolation Valves, which lists penetrations and valves, had errors of minor safety significance. These errors are listed in Section 9 of this report. This observation has little safety significance but some regulatory importance in the implementation of 10 CFR 50.59 in that an accurate USAR be maintained by the licensee. A similar problem was identified in the previous NRC inspection report (50-298/96-03) and the licensee at that time issued Condition Report 96-0160. The corrective actions to that report, including coordination to update and correct design and licensing basis errors and omissions, will be followed by an inspector followup item (298/9607-06).

7.3 (Open) Unresolved Item 298/9514-01: Spent Fuel Pool Cooling During Offload

During a recent evaluation of spent fuel pool decay heat removal and refueling practices, the NRC staff reviewed licensing basis documents for Cooper Nuclear Station. The documents included the USAR and documents associated with Amendment 52 to the Cooper license dated September 29, 1978 (rerack amendment). In these documents the inspector found that the routine core offload for these plants was described as being a partial offload.

In USAR Section 5.5, the licensee describes two spent fuel assembly offloads, normal and emergency. The USAR states:

> Case 1 Normal Heat Load
>
> The normal heat load case consists of one freshly discharged batch (approximately 160 bundles) in addition to the fuel (approximately 160 bundles) from each of the previous refueling outages.
>
> Case 2 Emergency Heat Load
>
> The emergency heat load case which produces maximum heat load results from the unscheduled discharge of the entire core just prior to a scheduled refueling outage. The freshly discharged fuel contributes the major portion of the heat load. This makes the total heat load quite insensitive to the number of assemblies cooled for more than a few years in the pool.

The maximum normal heat load is listed in USAR Table X-5-1 as 6.38 x 10^6 Btu/hr with a fuel pool temperature of 125°F, and the emergency heat load is listed as 16.6 x 10^6 Btu/hr with a fuel pool temperature of 150°F. This table lists the heat exchanger heat removal capacity as 3.19 x 10^6 Btu/hr for each of the exhangers.

Section 5.5 of the USAR describes use of the residual heat removal system to remove heat from the spent fuel pool. Specifically it states:

> The maximum possible heat load is the decay heat at the full core load of fuel at the end of the fuel cycle plus the remaining decay heat of the spent fuel discharged at previous refuelings. The residual heat removal system is operated in parallel with the fuel pool cooling and demineralizer system to remove this heat load . . .
>
> If it appears that the pool water temperature will exceed 150°F, the fuel pool cooling and demineralizer system can be connected by operator action to the residual heat removal system. This increases the cooling capacity of the fuel pool cooling and demineralizer system so that a water temperature below 150°F is maintained.

In the rerack amendment request dated July 22, 1977, the licensee also describes the normal and emergency heat loads. The normal heat load is associated with a partial fuel offload. The emergency heat load is associated with an "unscheduled discharge of the entire core just prior to a scheduled refueling outage," as stated in Section 3.3 of the submittal. Based on the reracked conditions, the heat loads would increase to 7.7 x 10^6 Btu/hr for the normal offload with an assumed cooling time of 7 days after shutdown, and to 19.8 x 10^6 Btu/hr for the emergency offload with a cooling time of 13 days. The licensee also states in the application that:

> For the maximum emergency case, . . . it is expected that the RHR system will be capable of handling the expanded maximum heat generation of 19.8 x 10^6 Btu/hr by either increasing the flow rate or by allowing the pool temperature to increase to not more that 160°F (the current maximum is 150°F) . . . .
>
> In both cases, the anticipated maximum heat loads can be accommodated without any modifications to the present pool cooling system, with minor changes in design values of the maximum allowable pool temperature (no more than 10°F increase) for relatively short periods (maximum of 8 days).

The inspectors observed that the USAR, through revisions dated July 22, 1994, did not reflect the revised heat loads described in the rerack amendment application. An October 1995 change to the USAR, performed in response to NRC

concerns, describes the heat removal capacity of the spent fuel pool cooling and RHR fuel pool in a manner that is consistent with the information included in the rerack application.

In the NRC staff's safety evaluation for the rerack amendment, the staff stated that it had focused on the higher fuel pool heat loads that would be generated by the larger number of fuel to be stored. The NRC staff commented in the safety evaluation about offload practices:

> ". . . NPPD [Nebraska Public Power District, the licensee] states that the maximum possible heat load in the spent fuel pool due to annual refueling will be 7.7 x 10^6 BTU/hr and that the heat load due to a full core offload will be 19.8 x 10^6 BTU/hr."

Further, the NRC staff calculated higher estimated heat loads for the offload cases based on the additional heat generated by the successive offloads along with higher potential fuel pool temperatures than that calculated by the licensee. Specifically, 9.1 x 10^6 BTU/hr and 138°F for the normal offload and 21.9 x 10^6 BTU/hr for the full core offload with temperature still maintained at 150°F based on the use of the residual heat removal system.

The inspector noted that the definition of normal versus emergency offloads was clear in the USAR and, further, the use of the term "unscheduled' in the USAR supports the conclusion that partial offloads were to be the normal or routine refueling outage practice. The NRC staff considers that the practice of routinely conducting full core offloads and introducing an abnormal heat load into the spent fuel pool to be a change to the normal practice defined in the Cooper licensing basis. Such a change to the operation of the facility should have been reviewed pursuant to the requirements of 10 CFR 50.59, including clear discussion of the systems relied on to remove the spent fuel pool decay heat for the duration of the outage, prior to implementing the practice of routinely offloading the full core.

The inspector noted that no 10 CFR 50.59 safety evaluation was done regarding this practice of performing full core offloads on a routine basis until October of 1995. In October 1995, after significant discussion with the NRC staffs, the licensee revised the USAR to reflect temperature limits and heat load during refueling and the systems that are relied on to maintain the spent fuel pool bulk temperature within those limits.

The performance of routine full core offloads during past refueling outages without performing appropriate 10 CFR 50.59 reviews and the untimely updating of the USAR to reflect information submitted to support the 1977 rerack application is an unresolved item (Update of 298/9514-01).

8 ONSITE REVIEW OF LERS (92700)

8.1 <u>(Closed) LER 298/93-019, Revision 0</u>: This LER was also identified as a Violation in NRC Inspection Report 50-298/93-17. The corrective and

preventive actions were discussed and reviewed as part of the closure of the violation in NRC Inspection Report 50-298/96-03. The inspectors verified that the corrective actions have been accomplished. No new issues were revealed by review of this LER.

8.2 (Closed) LER 298/93-027, Revision 1: This LER relates to LER 298/93-011 which identified that secondary containment surveillance testing failed to find a leak path. These corrective and preventive actions were discussed and reviewed as part of the closure inspection of Violation 298/9317-01, which was closed in NRC Inspection Report 50-298/95-03. The inspectors verified that the corrective actions have been accomplished. No new issues were revealed during review of this LER.

8.3 (Closed) LER 298/94-014, Revision 0: The issue identified in this LER is the same as that of a previous violation and will, therefore, be addressed during the review of Violation 298/9419-01 (update of 298/9419-01). No new issues were revealed during review of this LER.

9 REVIEW OF USAR COMMITMENTS

A recent discovery of a licensee operating their facility in a manner contrary to the USAR description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the USAR description. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the USAR that related to the areas inspected. The following inconsistencies were noted between the wording of the USAR and the plant practices, procedures, and/or parameters observed by the inspectors.

- Table V-2-7, Testable Primary Containment Isolation Valves, Pages V-2-44 to V-2-46, which lists penetrations and valves, had 23 penetrations (X20, X-30E and -30F, X-33E and -33F, X-35A through E, X-45D, and X-229A through L) and their associated valves missing.

- Inspectors identified that the USAR description of the residual heat removal system condensing mode was not clear in that in some cases two service water booster pumps were specified for system operation and in other cases only one service water booster pump was required for system operation. The licensee stated that Technical Specifications and design basis analysis clarify that only one service water booster pump per train is required for accident mitigation.

- Spent fuel pool heat loading concerns are discussed in Section 7.3 of this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Boyce, Engineering Support Manager
J. Dillich, Maintenance Manager
R. Gardner, Operations Manager
J. Gausman, Plant Engineering Manager
R. Godley, Licensing Manager
P. Graham, Senior Engineering Manager
J. Herron, Plant Manager
J. Mueller, Site Manager

NRC

M. H. Miller, Senior Resident Inspector
C. E. Skinner, Resident Inspector

The personnel listed above attended the exit meeting. In addition, the inspectors contacted other licensee personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on May 16, 1996. During this meeting, the inspectors reviewed the scope and findings of this report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.