

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-285/95-14

Operating License: DPR-40

Licensee: Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 399, Hwy. 75 - North of Fort Calhoun
Fort Calhoun, Nebraska

Facility Name: Fort Calhoun Station

Inspection At: Blair, Nebraska

Inspection Conducted: August 13 through September 23, 1995

Inspectors: W. Walker, Senior Resident Inspector
V. Gaddy, Resident Inspector

Approved:

John L. Pellet
John L. Pellet, Chief (Acting), Project Branch A

10-4-95
Date

Inspection Summary

Areas Inspected: Routine, unannounced inspection of onsite response to events, operational safety verification, plant support activities, maintenance and surveillance observations, onsite engineering and followup of corrective actions for violations.

Results:

Plant Operations

- An operator manipulated an incorrect switch during the performance of the diverse scram system surveillance, which resulted in a plant trip. This failure to follow procedure was identified as one example of a violation (Section 2.1).
- The licensee's review of the reactor trip indicated that Diesel Generator (DG) 1 accelerated to full speed instead of the expected response of going to idle speed. A determination was made that, as a result of the fast start, some of the 480V loads would not have properly load shed. In further review, the licensee determined that failure of these 480V loads to shed was outside the analyzed design basis for the diesel. Special Inspection 50-285/95-17 was initiated to review the

operability concerns and follow up on any outstanding concerns regarding operation of the DG (Section 2.2).

- Review of the temporary modification to restore Reactor Protection System Channel D indicated that it should have been more thoroughly prepared for implementation. The transfer switch which was to be used failed to pass acceptance criteria. This caused a delay in implementing the temporary modification (Section 3.3).
- A ladder was secured to conduit less than 2 inches diameter which lead to a junction box containing a fuse for the auxiliary feedwater system, contrary to procedure. This was a second example of licensee failure to follow procedure, identified as a violation (Section 3.4).
- The operations manager's crew briefing during the startup of the plant was good. Further, the coordination between the dedicated operator and the licensed senior operator while taking the reactor critical was good, with excellent repeat-backs and acknowledgements. The startup was well coordinated and executed (Section 3.5).
- The operators responded well when the DG 2 generator field failed to flash during surveillance activities (Section 6.1.2).

Maintenance

- There was a lack of effective coordination of equipment removal from service boundary and responsibility between operations and maintenance departments (Section 5.1).
- Maintenance technicians exhibited good questioning attitude by investigating why a heater fuse relay had not been isolated in preparation for relay maintenance (Section 5.1).
- Surveillance activities were performed properly and in accordance with procedures (Section 6).

Engineering

- The inspectors noted good procedural adherence in work practices by the maintenance technicians during replacement of fire protection piping. However, the inspectors noted that the length of time between the discovery of the hole in the piping and the issuance of an incident report appeared to be less than timely (Section 7.1).

Plant Support

- The inspectors identified that water was leaking through the roof of the auxiliary building onto a cable tray and that there was a residue of unknown composition building up on some of the cables. The licensee

performed a prompt chemical analysis which determined the residue was not detrimental to the cables (Section 4.3).

Summary of Inspection Findings:

- Violation 285/9509-01 was closed (Section 8.1).
- Violation 285/9514-01 was opened (Section 2.1 and 3.4).

Attachment:

- Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

At the beginning of this inspection period, the plant was operating at 100 percent power. On August 24, 1995, the plant was tripped from 100 percent power when a reactor operator manipulated an incorrect switch during a surveillance test of the diverse scram system.

The plant was restarted on August 26, and the unit achieved 100 percent power on August 29. The plant was operating at full power at the end of the inspection period.

2 ONSITE RESPONSE TO EVENTS (93702)

2.1 Reactor Trip During Diverse Scram System (DSS) Surveillance

On August 24, 1995, a licensed operator was performing Procedure IC-PM-DSS-1001, "Diverse Scram System Actuation Relay Operability Test, Revision 4." During performance of the test, the operator inadvertently operated the Channel B DSS test or bypass switch, SW B1/TS-DSS, rather than the DSS manual trip switch, B/TS-DSS, required by procedure. When the incorrect switch (B1/TS-DSS) was incorrectly placed from the test position to the normal position with the manual trip switch in trip position, the reactor tripped as designed.

During review of this event, the inspectors concluded that the reactor trip was a result of personnel error in that the operator failed to properly follow the procedure and adequately self-check to ensure the right switch was manipulated.

The licensee took actions to address this event, which included revising an operations department policy and directive, OPD-3-09, "Self-Checking/Attention to Detail, Revision 4," directing operators to verbally repeat which switch is about to be manipulated prior to initiation. Also, shift supervisors held informal training sessions with their crews to discuss this event and re-emphasize the importance of self-checking. In addition, the licensee reviewed all surveillance procedures which have critical steps in them that could cause significant plant or reactivity transients, misoperation of safeguard equipment, inoperability of safeguard equipment, or damage to other equipment. Following the review, certain procedures were revised to add a peer check or second verifier for critical steps. The inspectors considered the licensee's action in implementing peer checks to be a positive step toward eliminating future operator error.

Based on reviews performed by the inspectors, the failure to properly follow the surveillance test procedure for the diverse scram system is a violation (285/9514-01).

2.2 Acceleration of DG

On August 24, 1995, in response to the reactor trip, DG 1 started and accelerated to full speed (900 rpm) instead of the expected idle speed (500 rpm).

The inspectors discussed with the licensee the operation of the diesels and the time of the last surveillance on DG 1. The last surveillance was performed on August 16 and one of the steps in the procedure requires running the governor back to its idle position. It appears this step was inadvertently misperformed on the diesel voltage regulator switch which is an identical switch next to the governor control switch.

Based on the licensee's review of the event, the licensee determined that, as a result of the fast start, some of the 480V loads which require a time delay might not have properly load shed. Further review by the licensee determined that failure of these 480V loads to shed was outside the analyzed design basis for the diesel. In addition a similar problem had been identified during March 1995 with DG 2.

NRC Special Inspection 50-285/95-17 was performed to review the operability concerns and follow up on any outstanding concerns regarding operation of the diesel generators.

3 OPERATIONAL SAFETY VERIFICATION (71707)

3.1 Routine Control Room Observations

The inspectors observed operational activities throughout this inspection period to verify that adequate control room staffing and control room professionalism were maintained. Shift turnover meetings were conducted in a manner that provided for proper communication of plant status from one shift to the other. Discussions with operators indicated that they were aware of plant status, equipment status, and reasons for lit annunciators. Control room indications of various valve and breaker lineups were verified for current plant status.

3.2 Plant Tours

The inspectors routinely toured various areas of the plant to assess the safety conditions and adequacy of plant equipment. The inspectors verified that various valve and switch positions were correct for the current plant conditions. Piping and instrumentation drawings and operating instructions posted in vital areas were inspected and found to be current. Personnel were observed obeying rules for escorts, visitors, and entry and exit into and out of vital areas.

3.3 Temporary Modification To Reactor Protection System (RPS) Channel D

On August 14, 1995, the RPS Channel D reactor coolant temperature indicator failed (RTD D/TE-122H). This changed the RPS trip logic from two out of four to two out of three. The licensee determined that a temporary modification could be installed to restore Channel D to operable status.

As a result of the initial reviews performed by the inspectors, it appeared the licensee should have been more thorough in preparing for implementation of the temporary modification (TM95-6035) in that the temporary modification called for installation of a transfer switch which failed to pass acceptance criteria initially and caused a delay in implementing the temporary modification. Further review is being conducted in NRC Inspection Report 50-285/95-11.

3.4 Auxiliary Feedwater Panel

On August 16, 1995, during a tour of the west switchgear, the inspector observed that maintenance personnel had erected and secured an 8-foot step ladder to an electrical conduit to support Engineering Change Notice 92-183. The purpose of the change was to remove the PS-AUPS-001 security uninterruptable power supply located in the west switchgear room. The work was to be conducted in accordance with Construction Work Order 95-179.

Upon noticing the ladder was secured to the conduit, the inspector traced the conduit to a junction box. The junction box housed the breaker for Instrument Power AI-179 (Auxiliary Feedwater Panel). Panel AI-179 provided indication and control of the auxiliary feedwater system to allow for a safe shutdown of the plant during an emergency that resulted in the forced evacuation of the control room.

The inspector noted that the conduit the ladder was secured to was less than 2 inches in diameter. The inspector questioned maintenance personnel as to whether the ladder should have been secured to the conduit since the conduit was less than 2 inches in diameter. Maintenance personnel acknowledged that the ladder should not have been tied to the conduit.

Step 5.1.4 of Standing Order G-107, "Storage of Transient Equipment and Material to Prevent Seismic Interactions," states, in part, that ladders shall only be secured to conduits greater than 2 inches in nominal diameter. Securing the ladder to an electrical conduit less than 2 inches in diameter is a violation (285/9514-01).

To address this violation, the licensee planned to discuss this event with plant personnel and also reinforce the importance of following this procedure.

3.5 Startup Observations

On August 25-26, 1995, the inspector observed plant operators in the control room start up the plant and ascend in power. Prior to startup, the inspector

observed the operations manager give the control room crew a good approach-to-criticality briefing. The contents of the brief were outlined in a memorandum entitled "G-92 Briefing For Reactor Criticality." During the brief, the inspector noted that a licensed operator appeared to be inattentive. The licensed operator appeared to be reading other material during the briefing. At the conclusion of the briefing, the inspector discussed the observation with the operations manager and the operations manager counseled the operator on the importance of being attentive during shift turnover, especially when nonroutine activities were to be conducted. No other observations were noted during the briefing.

Prior to startup, the licensee determined that the prerequisite requiring all operable wide range nuclear instruments to be in extended range prior to criticality was not satisfied. Plant startup was delayed approximately 2 hours while the problem was resolved. Resolution involved calibration of the wide range detector. The resolution to this issue is discussed in Section 6 of this report.

After this issue was resolved, the inspector verified that all procedural prerequisites and conditions had been satisfied prior to taking the reactor critical. The minimum crew requirements were also met.

During the startup, a licensed operator was dedicated to take the reactor critical. The inspector noted that the dedicated operator remained in constant view of the controls. The individual was not distracted and was not assigned other duties during plant startup.

Good command and control was exhibited during startup. Operators acknowledged and identified alarming annunciators prior to silencing them. Access to the control room was restricted to limit distractions and noise was kept to a minimum.

While taking the reactor critical, the inspector noted that the coordination between the dedicated operator and the licensed senior operator was good. Excellent repeat-backs and acknowledgements were exhibited. The inspector concluded that the startup was well coordinated and executed.

4 PLANT SUPPORT ACTIVITIES (71750)

4.1 Radiological Protection Program Observations

During this inspection period, the inspectors verified that selected activities of the licensee's radiological protection program were properly implemented. Health physics personnel were observed routinely touring the radiologically controlled areas. Contaminated areas and high radiation areas were properly posted, and restricted high radiation areas were found to be locked, as required. Area surveys, posted outside each room in the auxiliary building, were found to be current.

The inspector observed health physics personnel perform routine surveys in the radiological controlled area. The surveys were conducted using good radiological practices. No unanticipated conditions occurred during the surveys.

4.2 Security Program Observations

The inspectors observed various aspects of the licensee's security program. Security personnel were found to perform their duties in a professional manner. Vehicles were properly controlled or escorted within the protected area. Designated vehicles parked and unattended within the protected area were found to be locked and the keys removed. The inspectors routinely toured the protected area perimeter and found it maintained at an excellent level. Proper compensatory measures were observed when a security barrier was inoperable.

4.3 Auxiliary Building Roof Leak

On September 5, 1995, during a tour of Room 69 (ventilation area), the inspector noticed that the roof of the auxiliary building was leaking. Water from the leak was dripping through a cable tray and onto the floor. The inspector inspected the condition of the cables inside the cable tray and noted what appeared to be a residue buildup on some of the cables. The inspector notified the licensee of the observation.

In response to the inspector's observation, the licensee initiated Incident Report 950605. The incident report indicated that the licensee had performed a visual inspection of the cables and determined that the wiring inside the tray had not been adversely affected. Chemistry analyzed the residue and determined that it was crystallized matter that formed when the water leached through the concrete and the metal reinforcement bars. Chemistry determined that the residue would not have a detrimental effect on the cables. The inspector agreed with this determination. The incident report also indicated that roof repairs were scheduled to begin in October 1995. In the interim, the licensee had installed a tarp over the cable tray to prevent additional water from dripping onto the tray.

4.4 Plant Housekeeping

During routine plant tours, the inspectors noted that housekeeping and plant material condition was good, with an exception. During a tour of the radiological controlled areas, the inspectors noted that housekeeping outside the personnel air lock was not good. The air lock was roped off as a contaminated area. The inspectors observed air samplers, tools, and other equipment stored inside the contaminated boundary. The inspectors asked the reason for having the equipment stored in the area. Health physics personnel stated that most of the equipment was needed to support containment entries. A few days later, the inspectors noted that all nonessential equipment had been removed from the area. Once excess equipment was removed, the inspectors judged the housekeeping to be good.

5 MAINTENANCE OBSERVATIONS (62703)

The maintenance activities listed below were observed and documentation reviewed to verify that the activities were conducted in a manner which resulted in reliable safe plant operation.

5.1 Maintenance Observations

- Maintenance Work Order 952784, "13.8kV Emergency Feed Monitoring and Auxiliary Instruments Relay Replacement"
- Maintenance Work Order 953017, "Charging Pump CH-1A Packing Repair"

5.1.1 Relay Replacement

On August 31, 1995, the inspector observed an electrical maintenance technician replace a relay in the 13.8kV emergency feed monitoring and auxiliary instruments/relay cabinet. The work was conducted in accordance with Maintenance Work Order 952784. The inspector noted that clearances had been hung and that the breaker had been tagged out by operations. The inspector verified that all prerequisites had been satisfied prior to beginning the maintenance activity.

Prior to beginning the maintenance, the inspector noted that the maintenance technician exhibited a good safety practice by verifying the voltage on the relay contacts to ensure that the relay had been thoroughly isolated. The technician noted that the voltage on one contact was 120 VAC. Since the presence of the voltage was not expected, the technician reviewed circuit drawings to determine why the voltage was present. The technician determined that a heater fuse had not been pulled, which allowed the voltage at the contact. The fuse was located in a control power circuit.

The inspector noted that the technician exhibited a good questioning attitude by investigating why the relay was not isolated. The inspector questioned maintenance to determine if the maintenance instructions should have provided directions to remove the heater fuse. Maintenance initially indicated that the planning instructions did not have to include this direction and that the fuse should have been pulled by operations. Operations indicated that, since maintenance did not request the fuse be pulled, it was not pulled. Operations also stated that they relied on maintenance to tell them what components they needed tagged out to support a maintenance activity.

The maintenance department later informed the inspector that, although historically they had not provided exhaustive lists of components for operations to tag out to support their maintenance activities, in the future, complete lists would be provided.

The inspector noted that there was confusion and a lack of effective communication between operations and maintenance as to which department had

responsibility for assuring all components necessary to support maintenance activities were tagged out.

To address the communication issue, the licensee issued Commitment Identification 950661/05 to investigate and provide a solution to the communication problem between operations and maintenance regarding when to tag out control power to circuits.

To address the immediate tagging concerns, the licensee planned to issue a memorandum addressing when control power will be tagged out and by which department. For the long-term, the licensee will review Procedure SO-G-20A, "Equipment Tagging Procedure," to determine if additional guidance for tagging out control power is needed.

5.1.2 Charging Pump CH-1A Packing Leak Repair

On September 13, 1995, the inspector observed portions of a maintenance activity to repair a packing leak in Charging Pump CH-1A. The leaking packing was causing an increase in the total reactor coolant system leak rate. The maintenance was conducted according to Maintenance Work Order 953017. The inspector verified all maintenance prerequisites were satisfied.

The work was conducted in a contaminated area and an airborne radiation area. Airborne concentration levels were continuously monitored by health physics personnel. The overall support provided by health physics was good.

Maintenance personnel adhered to the dress out requirements specified by the radiation work permit. Maintenance personnel exhibited good mechanical and radiation protection work practices. The portion of the packing leak repair observed was completed in a good manner without any anomalies.

6 SURVEILLANCE OBSERVATIONS (61726)

The inspectors observed the surveillance testing listed below to verify that the activities were performed in accordance with the licensee's approved programs and the Technical Specifications.

6.1 Surveillance Observations

The following surveillance activities were observed:

- Maintenance Work Order 952843, "RPS Channel Not In Extended Range"
- Surveillance Test Procedure OP-ST-DG-0002, "Diesel Generator 2 Check"
- Surveillance Test Procedure OP-ST-RW-3031, "Raw Water Pump AC-10D"

6.1.1 Nuclear Instrumentation Calibration

During plant startup on August 25, 1995, the prerequisite that all operable wide range nuclear instrument channels be in extended range was not satisfied. Plant startup was delayed until the condition could be corrected. To correct this discrepancy, Maintenance Work Order 952843, "Reactor Protection System," was generated to investigate why the detectors were not in the extended range. Technicians reset the bistables by lifting the input cables to the wide range detectors. Lifting the input leads to the detectors removed all neutron flux indications and inserted a zero input to the detector. With a zero input, the detector entered the extended range. The licensee indicated that, since the shutdown was short (2 day duration), xenon had not decayed to a level that allowed the detectors to enter the extended range. Following extended shutdowns, xenon would normally have decayed to a level that allowed the detectors to enter the extended range and this prerequisite was usually satisfied.

During the calibration, good safety practices were exhibited while lifting and reconnecting the cables. No anomalies occurred during the calibration.

6.1.2 Diesel Generator Monthly Operability Test

On September 1, 1995, the inspectors observed the performance of Surveillance Test OP-ST-DG-0002, "Diesel Generator 2 Check," Revision 14. This was the planned monthly operability test for DG 2.

The inspectors observed good command and control by the operations staff during the surveillance activities. The reactor operator conducting the test exhibited good self-checking in reviewing each switch manipulation prior to initiation. Also, repeat-backs were used during communications between the equipment operator stationed locally at the diesel and the reactor operator. Preplanning of activities was good in that an additional reactor operator from the relief crew was present during the surveillance to ensure adequate coverage for plant activities. Additionally, the shift supervisor was present in the control room during performance of the surveillance.

The reactor operator performed the test with procedural adherence apparent in that, due to recent changes in the procedure, several typographical errors existed. The test was stopped until all errors were reconciled with proper input from the procedure author and the shift supervisor. During performance of the test at Step 25, the operator was required to increase DG 2 speed to 900 rpm by placing the governor switch to the raise position. Normally when this was done the generator field would automatically flash at approximately 750 rpm. The inspectors observed that the field failed to flash and the diesel was left at 900 rpm while the licensee attempted to determine the problem.

The inspectors noted that the operating crew immediately contacted the system engineer and the electrical technicians to discuss the problem with DG 2. After initial troubleshooting for approximately 20 minutes, it appeared that a

field flash exciter breaker had tripped. The shift supervisor then directed that the diesel be secured to allow for further troubleshooting and repairs. The inspectors considered it a good practice that the shift supervisor immediately directed electrical technicians to verify that the field flash exciter breaker for DG 1 was not tripped. Subsequently, the electrical technicians determined that a control relay had failed. The relay was replaced and the surveillance test was successfully completed. Incident Report 950597 was written to document the failure.

6.1.3 Raw Water Pump Inservice Test

The inspector observed the quarterly inservice test of Raw Water Pump AC-10D. The surveillance was conducted in accordance with Procedure OP-ST-RW-3031. The inspector verified that all required testing prerequisites were satisfied.

The inspector observed electrical maintenance personnel record the motor bearing vibration velocity. The vibration readings were measured with properly calibrated equipment that was within the required accuracy range. All readings taken were within specification. The inspector verified that all parameters specified by the inservice testing plan were verified. No testing deficiencies were identified during the test.

The inspector also verified that the test data was properly evaluated for acceptability within the time specified by the American Society of Mechanical Engineer's Code. No operability concerns were identified during the pump run.

Overall, surveillance testing was performed properly and in accordance with procedures.

7 ONSITE ENGINEERING (37551)

7.1 Pin Hole Leak in Fire Main Piping

On August 18, 1995, the inspectors observed a pin hole leak on a 5-inch fire main pipe overhead in Room 19. This leak had been identified by operations personnel on August 8.

On August 14, the inspectors discussed with the fire protection system engineer whether an incident report had been written to document the leak. An incident report had not been written at that time but was subsequently written the following day (IR 9505673). The inspectors also questioned the system engineer concerning previous similar failures and were informed that a failure of a fire protection pipe seam weld had occurred in 1991 and was documented under Incident Report 910047. The inspectors noted that the length of time between the discovery of the hole in the piping and the issuance of the incident report (7 days) appeared to be less than timely.

The licensee performed ultrasonic testing on the piping which indicated adequate pipe wall thickness. The approximate 10-foot section of piping was replaced under Maintenance Work Order 952654. The inspectors noted good

procedural adherence and work practices by the maintenance technicians during replacement of the fire protection pipe.

The inspectors discussed with the system engineer whether additional testing would be conducted on the section of piping in the vicinity of the pin hole leak and were informed that a materials expert in special services engineering would determine whether the piping would be sent out for further testing.

The materials expert determined that the pin hole leak was a result of a phenomenon referred to as "stitching." This type of weld defect is caused by sporadic contact arching due to dirty contacts, resulting in a less than adequate fusion of the weld seam. The inspectors discussed with the licensee whether this type of a defect had been observed before and were informed that a similar leak was detected in the fire protection system in 1991.

Based on the discovery of this additional defect, the materials engineer recommended a biannual visual inspection of the outer painted surface of all fire protection piping to detect any blistering or other abnormalities that may be indicative of "stitching."

In addition, the inspectors questioned the licensee concerning the possibilities of microbiological induced corrosion (MIC). The materials engineer informed the inspectors that to test for MIC an immediate test would have to have been conducted. Also, the fire protection water is treated water which greatly reduces the chance for MIC. A recommendation was made by the materials engineer to test any new leaks in the fire piping system to confirm or dismiss the presence of MIC.

8 FOLLOWUP - CORRECTIVE ACTIONS FOR VIOLATIONS (92702)

8.1 (Closed) Violation 285/95-09-01: Failure to Implement Proper Radiation Protection Procedures

This issue involved the failure of a radiation protection technician to follow proper radiation protection procedures while working in a contaminated area.

The inspectors reviewed the licensee's corrective actions and found that the actions appropriately addressed this issue.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *B. Blome, Supervisor Corporate QA
- *J. Chase, Manager, Fort Calhoun Station
- *R. Connor, Assistant Manager, Fort Calhoun Station
- *G. Cook, Supervisor, Station Licensing
- *S. Crites, Acting Supervisor, Maintenance
- *R. DeMeulmeester Sr., Shift Supervisor
- *J. Gasper, Manager, Training
- *W. Gates, Vice President, Nuclear
- *R. Jaworski, Manager, Station Engineering
- *J. Keczy, Operations-Engineering
- *E. Matske, Licensing Engineer
- *T. Patterson, Division Manager, Nuclear Operations
- *R. Phelps, Acting Division Manager, Production Engineering
- *H. Sawhney, Nuclear Safety Review Specialist
- *J. Sefick, Manager, Security Services
- *J. Skiles, Acting Manager, Design Engineering
- *M. Tesar, Manager, Corrective Action Group
- *R. Wylie, Manager, Construction Management

The above personnel attended the exit meeting.

2 EXIT MEETING

An exit meeting was conducted on September 27, 1995. During this meeting, the inspectors reviewed the scope and findings of the 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.