

**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-285  
License No.: DPR-40  
Report No.: 50-285/99-11  
Licensee: Omaha Public Power District  
Facility: Fort Calhoun Station  
Location: Fort Calhoun Station FC-2-4 Adm.  
P.O. Box 399, Hwy. 75 - North of Fort Calhoun  
Fort Calhoun, Nebraska  
Dates: August 22 through October 2, 1999  
Inspectors: W. Walker, Senior Resident Inspector  
V. Gaddy, Resident Inspector  
J. Hanna, Resident Inspector  
Approved By: Charles S. Marschall, Chief, Project Branch C

ATTACHMENT: Supplemental Information

## SUMMARY OF FINDINGS

Fort Calhoun Station  
NRC Inspection Report 50-298/99011(DRP)

The report covers a 6-week period of resident inspection.

The body of the report is organized under the broad categories of Reactor Safety, Radiation Safety, and other activities.

Findings are assessed according to their potential risk significance and are assigned colors of green, white, or yellow. Green findings are indicative of issues that, while they may not be desirable, represent little or no risk to safety. White findings indicate issues with some increased risk to safety, which may require additional inspection resources. Yellow findings are more serious issues with higher potential risk to safe performance. No individual finding is indicative of either acceptable or unsafe performance. The findings are considered in total with other inspection findings and performance indicators to determine overall plant performance.

### **Cornerstone: Occupational Radiation Safety**

- Green. Radiation workers failed to immediately leave the charging pump room, during performance of work in the room, when a noble gas area radiation monitor was alarming.

This issue was characterized as having low safety significance based on the significance determination process review for occupational radiation safety. The failure to leave the charging pump room when a noble gas radiation monitor was in alarm could have resulted in an unintended personnel exposure. No overexposure occurred; however, and no significant exposure could have resulted from this event due to the highest sampled airborne radioactive concentration of approximately .1 DAC being well below the required posting of an airborne radiation area of .3 DAC. In addition, the ability to monitor and determine personnel dose was not lost as evidenced by the functioning air monitoring system and whole body counts performed on the workers who failed to exit the charging pump room. The licensee's review of this issue was consistent with the inspector's determination. The inspectors concluded that the workers failed to adhere to the requirement in Section 5.6.1 (c) of Standing Order SO-G-101, "Radiation Worker Practices," Revision 12, to immediately leave the area and notify the control room if an area radiation monitor or continuous air monitor alarms. We are treating this violation as a noncited violation, consistent with the Interim Enforcement Policy for pilot plants. The licensee documented this in their corrective action program as Condition Report 199901594 (Section 2OS4).

## Report Details

### Summary of Plant Status

The Fort Calhoun Station began this inspection period at 100 percent power and maintained that level until September 17, when a preplanned downpower was performed to 70 percent power and then to 30 percent power on September 24. This was in preparation for the refueling outage which commenced on October 2, 1999.

#### 1. **REACTOR SAFETY**

##### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R03 Emergent Work

##### a. Inspection Scope

The inspectors reviewed the action plan and activities to unclog CH-24 (Letdown Strainer).

##### b. Observations and Findings

There were no findings identified and documented during this inspection.

#### 1R04 Equipment Alignments

##### a. Inspection Scope

During this inspection period the inspectors performed partial walkdowns of the following emergency core cooling systems using OI-SI-1, "Safety Injection-Normal Operation."

- Low Pressure Safety Injection System, and;
- High Pressure Safety Injection System

##### c. Observations and Findings

There were no findings identified during this inspection.

#### 1R05 Fire Protection

##### a. Inspection Scope

Throughout this inspection period, the licensee performed maintenance on the main transformer deluge header valve and the north header stop valve. This required various parts of the fire protection system to be removed from service. The inspectors verified that proper contingencies were in place and that fire watches had been established. Additionally, combustibles were adequately controlled and fire protection system testing was performed as required.

b. Observations and Findings

There were no findings identified during this inspection.

1R10 Large Containment Valves

a. Inspection Scope

The inspectors verified the correct positioning of containment valves as indicated in the control room using Operating Instruction OI-CO-5, "Containment Integrity," Revision 12.

b. Observations and Findings

There were no findings identified during this inspection.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed two equipment failures to verify maintenance rule implementation. Specifically, the inspectors evaluated the tripping of Condensate Pump FW-2A and the removal of Component Cooling Water Pump AC-3A from the (a)(1) to the (a)(2) category.

The inspectors used the maintenance rule field flow chart and determined that the licensee properly dispositioned the failures and that the corrective actions were appropriate.

b. Observations and Findings

There were no findings identified during this inspection.

1R13 Maintenance Work Prioritization and Control

.1 Routine Maintenance

a. Inspection Scope

The inspectors reviewed the following items to ensure they were properly prioritized and controlled:

- FP-113 (Main Transformer Deluge Header Valve) and FP-119 (North Header Stop Valve), and
- Control Element Drive Mechanism Troubleshooting.

b. Observation and Findings

There were no findings identified during this inspection.

.2 Risk Integration

a. Inspection Scope

The inspectors reviewed in-plant activities and switchyard activities to verify that the risk associated with these activities had been properly evaluated.

b. Observations and Findings

The inspectors concluded that failing to perform a risk an integrated risk assessment did not constitute a violation of a regulatory requirement. This was, however, the second instance identified by the inspectors in which the licensee failed to consider total plant risk associated with maintenance. The inspectors considered the lack of a formal program for ensuring integrated risk assessments and the lack of consideration of risk impact from human performance illustrative of a problem with potential safety impact. The licensee documented the issues identified by the inspectors in Condition Report 199901861.

In NRC Inspection Report 50-285/99-08, the inspectors documented an instance in which the licensee did not perform a risk assessment that considered the total risk prior to removing emergency core cooling systems credited for mitigating a transient from service. Licensee procedures require that risk assessments be performed prior to releasing equipment for maintenance.

On September 15, 1999, the licensee removed a 345 kV offsite power line from service for maintenance. Prior to beginning the activity, the system engineer performed a risk assessment for this activity. The risk assessment results were green. Green risk significant activities contributed no additional risk due to equipment being out of service. Later that morning, systems operations personnel requested changes to the original work scope. The system engineer performed another risk assessment. This resulted in a yellow risk assessment. Yellow risk assessments indicate minimal additional risk for equipment taken out of service.

Coincident with the first risk assessment for the switchyard activities, the work week manager performed a risk assessment for planned maintenance in the plant. This risk assessment was green. Work evaluated by the risk assessment included removal of a raw water pump, the steam-driven auxiliary feedwater pump, and Motor Control Center MCC-4B1 from service. Removal of MCC-4B1 made a power-operated relief valve inoperable. These components could perform some accident mitigation function.

The inspectors determined that neither the assessment of work performed in the plant nor the assessment of work in the switchyard considered the potential risk impact of human performance. In addition, the licensee did not integrate the risk assessments for

the switchyard equipment removed from service with the assessment of the plant equipment removed from service to determine the total plant risk. Licensee risk analysts had developed a switchyard work process risk matrix that integrated plant and switchyard risk assessments. The matrix contained a list of equipment that could not be removed from service without first contacting licensee risk personnel so the total risk could be evaluated. For yellow risk significant conditions, the matrix does not allow operators to remove the power-operated relief valves and the steam-driven auxiliary feedwater pump from service without first contacting risk personnel. In this case, however, plant staff did not contact the risk analysts prior to removing equipment from service. Since plant personnel did not contact the risk analysts prior to removing this equipment from service, plant staff did remove a power-operated relief valve and the steam-driven auxiliary feedwater pump from service during a yellow risk significance condition. Licensee personnel stated that the matrix was not proceduralized but they relied on the work week managers to ensure its use. Based on the inspectors' questions, risk analysts performed the integrated risk assessment and determined that total risk remained low.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the operability evaluations associated with the following condition reports:

- CR199901634, "Waste Disposal Effluent Overboard Discharge Radiation Monitor RM-055," and
- CR199901701, "Fire Pump Operability With Valves FP-113 and FP-117 Isolated."

b. Observations and Findings

There were no findings identified during this inspection.

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors reviewed the following postmaintenance test:

- OP-ST-CEA-0003, "Control Element Assembly Position Indicating System (CEAPIS) Check," Revision 7, and
- OI-DG-1, "Diesel Generator 1," Revision 27.

b. Observations and Findings

There were no findings identified during this inspection.

1R22 Surveillance Testing

.1 Routine Surveillance Test

a. Inspection Scope

The inspectors observed performance of the following surveillance tests:

- Surveillance Test Procedure, SE-ST-AFW-3006, "Auxiliary Feedwater Pump FW-10, Steam Isolation Valve, and Check Valve Tests," Revision 23
- Surveillance Test Procedure, OP-ST-FP-0001C, "Fire Protection System Inspection and Test," Revision 6, and
- Surveillance Test Procedure, OP-ST-RC-0003, "PORV/Safety Valve Tailpipe Temperature Circuit Check," Revision 4.

The inspectors verified that the surveillance tests ensured equipment operability and demonstrated compliance with Technical Specification requirements. Inspectors verified that operations, engineering, and maintenance personnel were all involved in prejob briefs and testing. The inspectors also confirmed that equipment used was properly calibrated and, following testing, components were returned to their required position to maintain operability.

b. Observations and Findings

There were no findings identified during this inspection.

.2 Steam Generator Pressure Calibration

a. Inspection Scope

The inspectors reviewed the following surveillance test:

- Surveillance Test Procedure IC-ST-MS-0026, "Channel Calibration of Steam Generator RC-2A Channel A Pressure Loop A/P-902"

b. Observations and Findings

The inspectors determined that operators did not expect the secondary calorimetric (XC-105) calculation to be affected by a surveillance test. Both maintenance and operations personnel did not recognize that the surveillance would require entry into the

Technical Specifications. The inspectors concluded that recurrence of failure to understand the impact of a surveillance on plant operation could have a significant impact on plant safety.

On September 13, 1999, maintenance personnel performed Surveillance Test Procedure IC-ST-MS-0026. This test provided instruction for ensuring the accuracy of Pressure Loop A/P-902 for Steam Generator RC-2A. Steam generator pressure was an input into the XC-105 (secondary calorimetric) calculation. At 100 percent power, the plant operated at 1500 MW thermal. During the calibration, technicians affected the steam generator pressure input to the calibration, causing the calorimetric calculation to fail low. Calculation XC-105 was also an input into the better axial shape selection system which was used to determine the allowed power level for a given axial shape index. Operation Memorandum 99-01 required operators to reference Technical Specification 2.10.4(5) for an invalid XC-105 calculation. The Technical Specification required operators to restore the axial shape index to within the limits specified in the core operating limits reports within 2 hours or reduce power.

When technicians invalidated the input, operators recognized the cause and directed the technicians to restore the steam generator pressure input and back out of the surveillance test. Operators then declared the secondary calorimetric calculation operable and no power reduction was required.

#### IR23 Temporary Modifications

##### a. Inspection Scope

The inspectors reviewed the following temporary modifications:

DCP 10193 This temporary modification added temporary carbon filters to the containment purge system to increase iodine removal capability during containment purges.

DCP 10058 This temporary modification added leak sealant into the body-to-bonnet joint of FW-468 (Heater Drain Pump FW-5A Suction Valve) to stop leakage.

##### b. Observation and Findings

There were no findings identified during this inspection.

## 2 RADIATION SAFETY

### 2OS4 Radiation Worker Performance

#### a. Inspection Scope

The inspectors performed a review of Condition Report 199901594 issued on August 23, 1999. The condition report documented the failure of workers performing work in the charging pump room to leave the area immediately when a noble gas area radiation monitor was alarming.

#### b. Observations and Findings

Condition Report 199901594, written on August 23, 1999, documented that radiation workers failed to immediately leave the charging pump room during performance of work in the room when a noble gas area radiation monitor was alarming. The inspectors noted that the licensee immediately performed interviews with all workers involved to determine what corrective action was necessary. The management expectation that all workers would leave any area that has an area radiation monitor alarming was reinforced.

During discussions with the licensee, the inspectors were informed that it was not uncommon for a noble gas area radiation monitor to alarm during work on the charging pumps. When the noble gas area radiation monitor alarmed, one of the workers performing maintenance left the charging pump room and contacted a radiation protection technician; however, the other workers remained in the room while the noble gas area radiation monitor continued to alarm. The radiation protection technician responded to the charging pump room, sampled for elevated levels of noble gas activity, and determined that the level of noble gas activity was acceptable. The radiation protection technician did not require the workers to leave the room while conducting the noble gas sampling activities and the noble gas radiation monitor was still alarming during the sampling.

During the review of radiation protection procedures, the inspector noted that Section 5.6.1 (c) of Standing Order SO-G-101, "Radiation Worker Practices," Revision 12, required that, if an area radiation monitor or continuous air monitor alarms, workers immediately leave the area and notify the control room. Technical Specification 5.8.1 states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33. Regulatory Guide 1.33, Appendix A, Section 7, states these procedures are for limiting the materials released to the environment and limiting personnel exposure. Failing to leave the charging pump room when a noble gas area radiation monitor alarmed is a violation of Technical Specification 5.8.1, which is being treated as a noncited violation.

This issue was characterized as having low safety significance based on the significance determination process review for occupational radiation safety. The failure

to leave the charging pump room when a noble gas radiation monitor was in alarm could have resulted in an unintended personnel exposure. No overexposure occurred; however, and no significant exposure could have resulted from this event due to the highest sampled airborne radioactive concentration of approximately .1 DAC being well below the required posting of a airborne radiation area of .3 DAC. In addition, the ability to monitor and determine personnel dose was not lost as evidenced by the functioning air monitoring system and whole body counts performed on the workers who failed to exit the charging pump room. The licensee's review of this issue was consistent with the inspector's determination. The inspectors concluded that the workers failed to adhere to the requirement in Section 5.6.1 (c) of Standing Order SO-G-101, "Radiation Worker Practices," Revision 12, to immediately leave the area and notify the control room if an area radiation monitor or continuous air monitor alarms. We are treating this violation as a noncited violation, consistent with the Interim Enforcement Policy for pilot plants. The licensee documented this in their corrective action program as Condition Report 199901594.

#### 4. OTHER ACTIVITIES

##### 4OA2 Performance Indicator Verification

###### a. Inspection Scope

The inspectors verified the accuracy and completeness of the data used to calculate and report:

- the unplanned scrams per 7000 critical hours of operation
- scrams with a loss of normal heat removal
- reactor coolant system activity, and
- the reactor coolant system leakage performance indicator.

###### b. Observations and Findings

From a review of licensee data, the inspectors verified that the information as reported by the licensee was accurate for scrams per 7000 critical hours of operation and scrams with a loss of normal heat removal. Both of these indicators were green.

The inspectors reviewed April, May, June, July, and August 1999 reactor coolant system leakage and activity data and determined that the licensee accurately reported the performance indicator information. As of August 1999, both performance indicators were green. The inspectors verified that the procedures used by technicians to obtain reactor coolant system leakage and activity measurements were technically accurate. Additionally the inspectors reviewed several recently completed reactor coolant system leakage calculations and did not note any discrepancies.

During discussions with licensee personnel, the inspectors were informed that the potential existed for the reactor coolant activity indicator to go white if a reactor scram was necessary. This was due to the activity caused by fuel failures experienced over the last three cycles of operation at Fort Calhoun. The licensee did not anticipate exceeding any Technical Specification limit for dose equivalent iodine.

4OA4 Other

(Closed) LER 285/98004-00: Personnel Error Resulted in a Degraded Steam Generator Tube Being Left in Service. This LER was a minor issue and was closed.

(Closed) LER 285/98009-00: Waste Disposal System Containment Isolation Valves Outside Design Basis. This LER was a minor issue and was closed.

4OA5 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection of October 1, 1999. The licensee acknowledged the findings presented. The licensee did not consider any material examined during the inspection proprietary.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Clemens, Maintenance Manager  
M. Frans, Manager, Nuclear Licensing  
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