

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-285/92-11

Operating License: DPR-40

Docket: 50-285

Licensee: Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247

Facility Name: Fort Calhoun Station

Inspection At: Blair, Nebraska

Inspection Conducted: April 26 through June 6, 1992

Inspectors: R. Mullikin, Senior Resident Inspector
R. Azua, Resident Inspector

Approved: Elmo E Collins for 6/19/92
P. H. Harrell, Chief, Project Section C Date
Division of Reactor Projects

Inspection Summary

Inspection Conducted April 26 through June 6, 1992 (Report 50-285/92-11)

Areas Inspected: Routine, unannounced inspection of a previously identified inspection finding, licensee event report followup, onsite followup of events, operational safety verification, maintenance and surveillance activities, review of Temporary Instruction 2515/112, and Updated Safety Analysis Report review.

Results:

- o On May 14, 1992, the licensee experienced a turbine/reactor trip resulting from work being performed on a moisture separator level transmitter. (This was the licensee's first automatic reactor trip since July 1986) (paragraph 6.a).
- o Licensed operator performance following an automatic reactor trip was found to be excellent, especially in the area of coordination and team work.
- o Operators were noted as having made very good use of the emergency operating procedures (paragraph 6.a).

- o Identification of a licensee craft personnel walking on piping showed ineffective corrective action to a previous event. As a result, a violation was identified (paragraph 6.b).
- o Another instance of a nonquestioning attitude by plant personnel continued to point to a possible weakness in this area (paragraph 6.b).
- o Security and radiological protection management oversight and presence in the plant is considered a strength (paragraphs 6.c and 6.d).
- o Maintenance activities were performed with the use of approved procedures, and the personnel involved were found to be knowledgeable of the task (paragraph 7).
- o Surveillance activities were properly performed with good attention to detail (paragraph 8).
- o Change to diesel generator operating instruction format in response to licensed operators' concerns was found to be prompt (paragraph 8.a).

DETAILS

1. Persons Contacted

- *R. Andrews, Division Manager, Nuclear Services
- J. Bobba, Supervisor, Maintenance
- J. Chase, Assistant Manager, Fort Calhoun Station
- *G. Cook, Supervisor, Station Licensing
- M. Frans, Supervisor, Systems Engineering
- *S. Gambhir, Division Manager, Production Engineering
- *J. Gasper, Manager, Training
- *W. Gates, Division Manager, Nuclear Operations
- R. Jaworski, Manager, Station Engineering
- *L. Kusek, Manager, Nuclear Safety Review Group
- *W. Orr, Manager, Quality Assurance and Quality Control
- *T. Patterson, Manager, Fort Calhoun Station
- R. Phelps, Manager, Design Engineering
- A. Richard, Assistant Manager, Fort Calhoun Station
- J. Sefick, Manager, Security Services
- C. Simmons, Station Licensing Engineer
- F. Smith, Supervisor, Chemistry
- *R. Short, Manager, Nuclear Licensing and Industry Affairs
- J. Tills, Assistant Manager, Fort Calhoun Station
- D. Trausch, Supervisor, Operations

The inspectors also contacted additional personnel during this inspection period.

*Denotes attendance at the monthly exit interview on June 9, 1992.

2. Plant Status

At the beginning of this inspection period, the Fort Calhoun Station was heating up in preparation for restart from its 13th refueling outage that began on February 1, 1992. The plant went on-line May 3.

Power ascension was commencing when an automatic reactor trip occurred on May 14, while the plant was at 98 percent power. The reactor trip resulted from a main turbine trip due to high moisture separator reheater water level. This was the first automatic reactor trip since July 1986. The plant reached 100 percent power on May 22.

The plant operated at 100 percent power until May 31, when a control element assembly dropped into the core. This dropped assembly required going to hot shutdown per the Technical Specifications. The Fort Calhoun Station returned to 100 percent power on June 5, where it remained throughout the rest of the inspection period.

3. Review of a Previously Identified Inspection Finding (92702)

(Closed) Violation 285/9030-01: Inadequate Postmaintenance Testing.

Valve YCV-1045A is the steam supply valve for the turbine-driven auxiliary feedwater pump. This valve has an air accumulator to ensure valve closure in the event of a steam generator tube rupture. A solenoid valve for the instrument air supply to Valve YCV-1045A was replaced by the licensee, but no postmaintenance testing was performed or required by Maintenance Procedure MP-SOV-1. Approximately 3 weeks later, the accumulator failed its quarterly scheduled surveillance test due to air leakage from the replaced solenoid valve.

The licensee's corrective actions included a revision to the maintenance procedure for replacement of ASCO solenoid valves to ensure that the bolts were tightened. In addition, the licensee performed a review of all preventive maintenance work plans to determine if they contained satisfactory postmaintenance testing requirements. The licensee revised approximately 15 percent of the total work plans based on this review. Based upon the corrective actions taken, it appeared that the licensee appropriately addressed this issue.

4. Licensee Event Report (LER) Followup (92700)

- a. (Closed) LER 91-019: Approved Procedure Could Have Prevented Containment Spray From Fulfilling Design Function.

This event concerned the discovery that Operating Instructions OI-NG-1, "Nitrogen System Normal Operation," and OI-SI-1, "Safety Injection Normal Operation," had different normal positions listed for the nitrogen backup air supply valves for the containment spray header isolation valves. The licensee discovered during the procedures upgrade project that Procedure OI-SI-1 had the nitrogen backup valves as closed and Procedure OI-NG-1 had them as open. The valves are on nitrogen bottle and provide a means to maintain operation of the containment spray header isolation valves when instrument air is lost. The licensee verified that the correct valve position was closed. The procedure change was subsequently put on hold until a modification was completed on the nitrogen supply skid.

However, before the procedure change was made, the licensee determined through the design basis reconstitution project that the correct nitrogen supply valve position should be open. Procedure OI-SI-1 was changed to reflect a required open valve position. Procedure OI-NG-1 did not require revision since a change to the procedure had not been made. After the installation of the new nitrogen supply skid, the procedure upgrade process for Procedure OI-NG-1 was started and the valve position was changed to

closed. The Nuclear Safety Review Group discovered the error after the Plant Review Committee had approved the procedure change.

The licensee determined the root cause to be an inadequate preparation and review of the 10 CFR Part 50.59 safety evaluation accompanying the procedure revision. In addition, a contributing cause was determined to be the lack of timeliness of the procedure change process (approximately 15 months).

The safety significance of the incorrect valve position was low since Procedure OI-NG-1 would only be used during bottle changeout and had not been implemented. In addition, the "as-found" valve position was in the open position.

The licensee's corrective actions included revising Procedure OI-NG-1; incorporating this event into 10 CFR Part 50.59 training; and revising Standing Order SO-G-73, "Fort Calhoun Station Worker's Guide," to require that reference documents used in the procedure change be verified current before submittal to the Plant Review Committee. These corrective actions are sufficient to satisfy this concern.

- b. (Closed) LER 91-020: Unmonitored Steam Generator Release to Missouri River.

This LER documented an unmonitored release of hydrazine to the Missouri River. During the 1992 refueling outage, the steam generators were filled with hydrazine for oxygen scavenging and pH control. Operating Instruction OI-FW-6, "Steam Generator Draining," provided guidance for draining the steam generators to the waste monitor tanks for hydrazine neutralization. The procedure required that a jumper hose be installed between the steam generator blowdown system and the monitor tanks. However, the operating instruction valve lineup for the draining of the steam generators was started before the jumper hose installation tags were cleared. Thus, when the tags were cleared, Valve FW-213 (blowdown isolation valve to the raw water discharge) was returned to its normally open position. The checklist for Operating Instruction OI-FW-6 had verified Valve FW-213 as being closed by the previous operating crew. This resulted in the release to the river.

The licensee's corrective actions included revising Operating Instruction OI-FW-6 to require that the tag outs be cleared before the valve lineup checklist be initiated. In addition, the licensee reviewed other procedures that require the use of jumpers to ensure that no similar problems existed. These actions have been completed and resolved this concern.

- c. (Closed) LER 91-026: Expired NRC Licensed Operator Medical Examination.

This LER documented the November 1991 discovery that a senior reactor operator had not had the complete medical examination required by 10 CFR Part 55.21. On February 7, 1991, the operator received a respirator physical instead of the licensed operator physical. The difference between the two physicals was a hearing and eye examination. On November 8, the operator successfully passed the licensed operator physical. The senior reactor operator served as shift supervisor on several occasions from February 26, until the discovery of a lack of a complete physical. This operator normally was not an onshift shift supervisor but was a replacement, when required.

The licensee determined the root cause to be a lack of a single controlling procedure for the operator physicals. At the Fort Calhoun Station, three different departments (security services, operations, and training) have a portion of the responsibility.

The licensee's immediate corrective action was to remove the operator from onshift duties until a physical was obtained. Long-term corrective actions were to create Standing Order SO-G-93, "NRC Licensed Operator Physicals," to define responsibilities for the program, issue a memorandum to all licensed operators to clarify differences between physicals, and install a flag on the licensee's computer program for approaching physical expiration dates. The inspector reviewed the licensee's corrective actions and determined them to be satisfactory to resolve this issue.

5. Onsite Followup of Events (93702)

a. Personnel Airlock Barrel Test Leakage

At 4:10 p.m. on May 8, 1992, the licensee declared a Notification of Unusual Event following a determination that containment integrity had been violated.

With the plant at 64 percent power, the licensee was performing an "as found" leakage rate test on the personnel airlock assembly. Surveillance Procedure IC-ST-AE-0001, "Containment Personnel Airlock Type B Leak Rate Test," was used. The resultant "as found" leakage rate was found to be 2.4 standard cubic feet per minute (scfm), which exceeded the total allowed leakage rate of 1.87 scfm. Operations personnel were notified. The shift supervisor, who was not aware as to the exact location of the leakage, made a conservative decision that containment integrity had been violated. The licensee declared a Notification of Unusual Event and operations personnel began making preparations to reduce reactor power as required by the Technical Specifications.

Personnel in the area of the personnel airlock assembly identified that the possible source of the leak was located at the handwheel shaft penetration of the outer personnel airlock door. The handwheel shaft packing was tightened, which resulted in a gradual decrease in the amount of leakage that was originally identified. When the leakage rate decreased sufficiently below 1.87 scfm to 1.47 scfm, the licensee determined that containment integrity had been regained, and at 4:45 p.m. the licensee exited the Notification of Unusual Event. The leakage rate through the outer personnel airlock door continued to decrease until it leveled off at approximately 0.17 scfm. Based on this information, the licensee determined that the inner personnel airlock door did not leak and thus, containment integrity had not been lost during this event. The licensee's decision to declare a Notification of Unusual Event was found to be a conservative decision.

A postevent review indicated that containment integrity had not been lost, as was originally believed. Based on this information the licensee determined that this event did not represent a violation of containment integrity and that entry into the Technical Specifications, with the corresponding declaration of the Notification of Unusual Event, was not necessary. Thus on June 4, the licensee withdrew this event notification.

b. Reactor Trip

On May 14, 1992, at approximately 3:57 p.m. the Fort Calhoun Station experienced a turbine trip as a result of a moisture separator high level trip signal, which subsequently led to an automatic reactor trip on a loss-of-load signal.

The cause of the moisture separator high level trip was due to an effort to repair a steam leak on the C Moisture Separator Level Transmitter. When the repair was completed, the operators began opening the level transmitter's upper isolation valve (FW-929) in preparation for postmaintenance testing. Moisture in the line above the valve drained into the transmitter, setting off a high-level trip signal to the turbine.

The plant was stabilized shortly thereafter, with all plant equipment having performed as expected.

The inspectors will perform further review of this event during routine review of LER 92-014.

c. Boric Acid Corrosion of Carbon Steel Fasteners

On May 21, 1992, the licensee determined that corroded carbon steel fasteners on the inlet and outlet flanges of both boric acid pumps had the potential for a complete loss boric acid inventory from

Tanks CH-11A and -11B. The fasteners were discovered corroded due to boric acid leakage after insulation was removed during the recent refueling outage. The corroded fasteners were replaced with carbon steel fasteners. Visual and ultrasonic inspections were performed on the boric acid piping prior to returning the system to service.

The inspectors will perform further review of this event during routine review of LER 92-018.

d. Dropped Control Element Assembly

On May 31, 1992, while at 100 percent power, the Fort Calhoun Station experienced a dropped control element assembly. The assembly inserted fully into the core. Technical Specification 2.10.2(4)e required reducing power, within 1 hour, to 7 percent with a misaligned control element assembly. When the licensee could not retrieve the dropped assembly, a shutdown was commenced and a Notification of Unusual Event was declared at 11:57 p.m. The Notification of Unusual Event was terminated at 4:10 a.m. on June 1, when the plant reached hot shutdown.

The licensee discovered a shorted coil on the electromagnetic clutch for Control Element Assembly 35. The control element assemblies at the Fort Calhoun Station operate on a rack and pinion mechanism. The rack is driven vertically by the pinion, which is driven by an electric motor operating through a reducing gear box and an electromagnetic clutch. Upon tripping the clutch, the rack with the attached control element assembly drops into the core due to gravity. The licensee replaced the shorted coil, startup was commenced, and the reactor went critical at 2:11 a.m. on June 2.

The inspectors will perform further review of this event during routine review of LER 92-019.

Conclusion

The operator's response to infrequent plant events was excellent.

6. Operational Safety Verification (71707)

a. 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, and 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 conditions.

The licensee instituted a new shift turnover format. Previously, each offgoing crew member would brief their counterpart on the incoming crew. Then, the oncoming shift supervisor would brief the entire oncoming crew. This format continued; however, an earlier briefing by the offgoing shift supervisor to the entire oncoming crew has been added. This briefing is performed in a separate area (operator loft) of the control room complex. The inspector noted that this provided for a good exchange of information with virtually no outside distractions.

Following the May 14, 1992, turbine/reactor trip on moisture separator high level, the inspector observed that the operators' performance in identifying plant conditions and stabilizing the plant was excellent. The operators' demeanor was professional and their efforts were found to be aggressive, purposeful, and timely. The operators were also noted as having made very good use of the emergency operating procedures. Extra licensed operators that were available provided assistance to the operators on shift (i.e., silencing alarms that had been acknowledged and reading gauges off of remote panels in the control room). This minimized the need for the shift operators to leave their assigned stations. In addition, the shift supervisor's performance was found to be unobtrusive, allowing the lead operator to take the actions listed in the emergency operating procedures. The shift supervisor provided support and guidance when needed, while maintaining an overall picture of the events as they transpired.

b. Plant Tours

The inspectors routinely toured various areas of the plant to inspect safety-related equipment, fire barriers, and security doors, in addition to verifying that proper housekeeping was being maintained. Plant housekeeping was found to be improving in certain areas, as more of the outage-related equipment was removed. Certain areas though did not appear to meet preoutage conditions. These areas were found to contain debris and other transient materials such as ladders, rags, empty buckets, etc. Examples of some of the areas encountered included the raw water pump room, located in the intake structure, which was found to have copious amounts of silt lying on the floor, in addition to a ladder that was stored against one of the walls. Also, in Room 19, sections of discarded tygon tubing were found lying close to one of the air compressors, with associated test fittings and some trash discarded to one side of the room.

On several occasions during this inspection period, the inspector accompanied auxiliary operators on their periodic tours of the

turbine building and the auxiliary building. During these tours, the inspector found the operators to be knowledgeable of their responsibilities, as determined through conversations with the operators, and by observing them performing their duties.

On May 12, 1992, while touring the auxiliary building with a nonlicensed operator, the inspector noted that one of the licensee's craft personnel was standing on a pipe associated with the boric acid system. The individual was involved in insulating the piping of that system and was using the pipe as a stand, so as to reach another section of pipe located higher up. This activity was contrary to the requirement of Standing Order SO-M-100, "Conduct of Maintenance," which stated, in part, that crafts do not climb on piping without the approval of engineering. No such engineering approval was given. In addition, Standing Order SO-M-100 required that personnel adhere to the Fort Calhoun Station Safety Manual, which stated that personnel shall not stand on critical quality element or limited critical quality element piping of wall thickness less than Schedule 40. The boric acid system piping thickness is Schedule 10 and critical quality element equipment is considered safety-related.

The inspector notified the site quality control personnel, who in turn informed plant management. Plant management halted the work until appropriate equipment, such as stools and step ladders, were provided to the craft. The quality control inspector issued Corrective Action Report 92-140 to establish measures to prevent recurrence. Previously, on February 27, 1992, a similar incident was noted by the inspector, and the licensee documented the event in Corrective Action Report 92-044. The completed corrective actions set forth in that report were apparently inadequate due to the fact that they failed to prevent recurrence of this event. This is a violation of NRC requirements. (285/9211-02)

At the time of the discovery, the inspector questioned the nonlicensed operator as to whether the craft's actions, as seen by the inspector and the operator, were a concern. The operator responded that if the craft had the approval to work in that area, his actions must be appropriate. This apparent lack of a questioning attitude is considered a concern. It must also be noted that there were other personnel in the area at the time of the discovery and that none appeared to be concerned with the craft personnel's activities.

c. Radiological Protection Program Observations

The inspectors verified that selected activities of the licensee's radiological protection program were implemented in conformance with policies, procedures, and regulatory requirements. Radiation and/or contaminated areas were properly posted and controlled. Health

physics personnel and radiation protection management were observed to be touring work areas on a routine basis to ensure that proper radiological protection practices and radiological control requirements were properly implemented.

Housekeeping in the auxiliary building following the outage has been very good with a notable reduction in contaminated areas. Also notable has been the gradual reduction of clutter, such as health physics supply cabinets, from all areas of the auxiliary building such as what existed in the upper mechanical penetration room (Room 59).

d. Security Program Observations

The inspectors observed various aspects of the licensee's security program. On May 6, 1992, the inspector toured the central alarm station and noted that security personnel were properly monitoring the efforts of a technician working in the isolation zone. During the subsequent shift turnover, the inspector noted that the outgoing officer properly conveyed to the oncoming officer the plant conditions as they related to plant security. The officers were found to be very knowledgeable of their responsibilities. Personnel and packages entering the protected area were observed to be properly searched. Escorts were noted to be maintaining proper control of visitors. Security and security management personnel were observed touring the plant, ensuring that the security program was properly maintained.

e. Observation of Management Activities

During this inspection period, the inspectors were informed that the Operations Supervisor would be taking a temporary assignment (approximately 15 months) offsite. An Assistant Plant Manager was assigned as the temporary replacement. A transition period was in progress during this inspection period, where the Assistant Plant Manager was assuming more of the duties. The inspectors noted that the Acting Operations Supervisor exhibited good coordination with the operators and good communication with the inspectors on plant status.

Conclusions

Licensed operator performance following an automatic reactor trip was found to be excellent. The coordination and team work experienced during this effort reflected well on the licensee's simulator training program. In other areas though, instances continued to arise that indicate a lack of a questioning attitude by some plant personnel.

In the areas of radiation protection and security, personnel were found to be knowledgeable of their responsibilities. In addition, management oversight of personnel activities in these two areas was considered a strength.

7. Maintenance Observations (62703)

On May 27, 1992, the inspector observed selected portions of the work performed per Maintenance Work Order 927162. This work addressed the repair of the auxiliary feedwater steam-driven pump back pressure valve, which had failed its back pressure trip setpoint check.

The inspector verified that all required equipment was properly tagged out-of-service and work instructions were sufficient to perform the job. In addition, it was observed that proper care was used in the performance of the task. The maintenance work order had been reviewed and approved prior to use as indicated by the appropriate signatures. Finally, the inspector interviewed the licensee personnel involved in the repair and it was apparent that they were knowledgeable of the work that they were performing.

Conclusions

Maintenance activities were performed with the use of approved procedures and the personnel involved were found to be knowledgeable of the task.

8. Surveillance Observations (61726)

- a. On May 13, 1992, the inspector witnessed operations personnel perform operability testing, per Operating Instruction OI-DG-0002, "Diesel Generator 2 Normal Operation." This test was performed to verify the operability of Diesel Generator 2 by determining its capability to handle its required loads. The inspector noted that attention-to-detail was apparent throughout the performance of the test.

It was noted that the Procedure OI-DG-0002 was recently revised, addressing the operators concern which were previously raised in NRC Inspection Report 50-285/91-27, regarding the confusion factor involved in its use. The present revision to the procedure did not require that the operators flip back and forth through the procedure during a surveillance, thus reducing the conditions that could lead to an operator error. The prompt response to operator concerns in this area was found to be good.

- b. On May 14, 1992, the inspector witnessed the performance of Surveillance Test Procedure OP-ST-ESF-0009, "Channel A Safety Injection, Containment Spray and Recirculation Actuation Test." This test was performed to satisfy the monthly requirements of Technical Specification 3.1, Table 3.2. The procedure used was an

approved procedure, as indicated by the appropriate signatures. The inspector noted that attention-to-detail by the operator involved was apparent throughout the performance of the test. In addition, the inspector verified that the test results met the acceptance criteria.

Conclusions

Surveillance activities were properly performed with good attention-to-detail. Prompt response to operator concerns with procedure adequacy was found to be good.

9. Evaluation of Changes to the Environs Around Licensed Reactor Facilities (TI 2515/112)

The inspector reviewed the licensee's program for evaluating the public health and safety issues resulting from changes in population distribution or in industrial, military, or transportation hazards that could arise.

The inspector examined Chapter 2.0 of the licensee's Updated Safety Analysis Report, "Site and Environs," which describes the demographic distribution in the area surrounding the Fort Calhoun Station. This data is updated approximately every 10 years, when the results of the federal census are made available. With this information, the licensee projects population growth in the area surrounding the plant for the following 10 years. It was noted that the licensee's projected population growth for 1990 was conservative and exceeded the actual growth experienced over the last 10 years, as demonstrated by the 1990 federal census. During this periodic review, the licensee also reexamines the industrial, military, and transportation hazards that existed earlier and compares them to those that exist today.

In between the 10 year reviews, the licensee was found to have an informal program whereby state and local officials keep the site emergency preparedness management personnel informed of any drastic changes in population growth or any major changes in the industry of the area. As an example, the licensee was informed by local officials that three sites, located within the 10 mile radius of the plant, were being considered as the possible sites for a small municipal airport. The licensee is presently evaluating the impact that such a facility may have on plant safety and the sites emergency preparedness program. In addition, local civil defense coordinators inform the licensee of any shipments of hazardous material that are scheduled to pass through the area. This line of communication is routinely maintained by the site emergency preparedness management. It must be noted that the land within 40 miles of the plant site is used primarily for farming with the exception of the industrialized cities of Omaha and Fremont, Nebraska, and Council Bluffs, Iowa. It is probable that the area around the plant site outside of the Omaha metropolitan area will remain largely

agricultural and that the population will increase slowly, as indicated by the most recent census results. Due to these considerations, the licensee program appeared to be satisfactory at this time.

The licensee updates the Updated Safety Analysis Report periodically on an annual basis, whenever new information is obtained.

10. Updated Safety Analysis Report Review

In November 1991, the Commission directed the staff to determine how licensees are responding to the requirement in 10 CFR Part 50.71 for annual updates of the Safety Analysis Report. This was to ensure that the information included in the report contains the latest material, and to determine whether it describes the licensee's current licensing basis.

On April 27, 1992, the inspector accompanied members of the Office of Nuclear Reactor Regulation in a fact-finding visit with the licensee. The results of this visit, along with other selected licensees will be included in a future report to the Commission.

11. Summary of Open Items

The following is a synopsis of the status of all open items generated and closed in this inspection report.

LERs 91-019, 91-020, and 91-026 were closed.

Violation 9031-01 was closed.

Violation 9211-01 was opened.

12. Exit Meeting

The inspectors met with Mr. W. G. Gates (Division Manager, Nuclear Operations) and other members of the licensee staff on June 9, 1992. The meeting attendees are listed in paragraph 1 of this inspection report. At this meeting, the inspectors summarized the scope of the inspection and the findings. During the exit meeting, the licensee did not identify as proprietary, any information provided to, or reviewed by the inspectors.