

APPENDIX
U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-285/84-16

License: DPR-40

Docket: 50-285

Licensee: Omaha Public Power District
1623 Harney Street
Omaha, Nebraska 68102

Facility Name: Fort Calhoun Station

Inspection At: Fort Calhoun Station, Blair, Nebraska

Inspection Conducted: July 1-31, 1984

Inspector: *L. A. Yandell* 8/20/84
L. A. Yandell, Senior Resident Reactor Inspector Date

Approved: *L. E. Martin* 8/20/84
L. E. Martin, Section Chief, Project Section A, Date
Reactor Project Branch 2

Inspection Summary

Inspection Conducted July 1-31, 1984 (50-285/84-16)

Areas Inspected: Routine, announced inspection of operational safety verification, surveillance testing, maintenance, plant startup activities, and OPPD reorganization. The inspection involved 96 inspector-hours onsite by one NRC inspector.

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

DETAILS

1. Persons Contacted

- *R. L. Andrews, Division Manager, Nuclear Production
- *W. G. Gates, Manager, Fort Calhoun Station
- L. T. Kusek, Supervisor, Operations
- M. R. Core, Supervisor, Maintenance
- J. J. Fluehr, Reactor Engineer
- R. A. Johansen, Test Engineer
- R. Wentworth, Quality Control Inspector
- D. W. Dale, Senior Quality Control Inspector
- J. Tucker, Electrical Engineer-GSE
- G. Jepsen, Technical Services Engineer
- R. J. Mueller, Supervisor, I&C and Electrical Field Maintenance
- K. A. Miller, Test Engineer
- M. Rad, Engineer
- J. J. Fisicaro, Licensing Administrator Supervisor, Nuclear Regulatory and Industry Affairs
- J. J. Tesarek, Plant Engineer

*Denotes attendance at the exit interview.

The NRC inspector also talked with and interviewed other licensee employees during the inspection. These employees included licensed and unlicensed operators, craftsmen, engineers, and office personnel.

2. Operational Safety Verification

The NRC inspector performed activities as described below to ascertain that the facility is being maintained in conformance with regulatory requirements and that the licensee's management control system is effectively discharging its responsibilities during plant shutdown, startup and testing, and power operation.

- a. The NRC inspector made several control room observations to verify proper shift manning for the various plant modes, operator adherence to approved procedures, adherence to selected Technical Specifications, and operability of the reactor protective and engineered safeguards systems. Selected logs, records, recorder traces, annunciators, panel indications, and switch positions were reviewed to verify compliance with regulatory requirements. The licensee's equipment control was reviewed for proper implementation by reviewing various maintenance orders, the tag-out log, and selected safety-related tag-outs. Several shift turnovers were observed and shift turnover sheets were reviewed during this inspection period.

- b. The NRC inspector toured the plant at various times to assess plant and equipment conditions. The following items were observed during these tours:
- . general plant conditions
 - . vital area barriers not degraded or appropriately manned by security personnel
 - . adherence to requirements of radiation work permits (RWPs)
 - . proper use of protective clothing and respirators
 - . plant housekeeping and cleanliness practices including fire hazards and the control of combustible material
 - . work activities being performed in accordance with approved activities
 - . physical security
 - . HP instrumentation operability and calibration

It was brought to the attention of the licensee that overall cleanliness in the auxiliary building (particularly Room 69 near DW 46 A&B, Room 13, Corridor 26 by the rollup door and railroad siding, and Room 59) was below standard and needed to be addressed. Some cleanliness problems were expected to occur at the end of an outage, but management attention needed to be directed toward correcting this situation quickly.

- c. The NRC inspector verified operability of the following safety-related systems by performing a walkdown and switch verification of the accessible portions of the system:
- . Reactor Startup Locked Valves per Checklist RC-2B-CL-D
 - . Engineered Safeguards Controls per Checklist ES-1-CL-A
 - . Plant Electrical Distribution per Checklists EE-1-CL-A and EE-2-CL-A
 - . High Pressure Safety Injection System per Checklist SI-1-CL-A
 - . Low Pressure Safety Injection System per Checklist SI-1-CL-B
- d. The NRC inspector observed portions of Discharge No. 84210 for "B" Monitor Tank and reviewed the discharge permit. It was noted that:
- . the permit was properly filled out and approved

- . chemical/radiological analyses were performed
- . all chemical/radiological discharge limits were within specification at the discharge tunnel
- . tank was in recirculation 30 minutes prior to sampling
- . the functional test of RM-055A was performed to verify that HCV-691 and HCV-692 would shut on a high alarm
- . maximum release rate was established
- . the required recorders were operational
- . three circulating water pumps were in operation
- . initial and final tank levels and totalizer readings were recorded
- . OI-WDL-3, Section IV.A was completed and attached to the discharge permit

The NRC inspector observed portions of Containment Purge 84036 and noted the following:

- . the X/Q log was maintained, the limiting X/Q was identified, and the readings were within limits
- . the annubar and stack dewpoint readings were taken
- . radioactive analyses were taken and compared with limiting valves
- . the tritium sampler was in place
- . effluent monitors and three auxiliary building exhaust fans were operating
- . the maximum release rates were calculated and the actual release rate established was within this valve
- . testing of VIAS actuation was performed in accordance with OI-VA-1, Step IV.G
- . the permit was properly reviewed and signed off
- . required recorders were operational, and both the initial and final readings of the stack flow integrator were annotated

The licensee was cited in NRC Inspection Report 50-285/84-07 for failing to terminate a containment purge when a X/Q reading was greater than the limiting X/Q for the established flow rate. In OPPD Letter LIC-84-151, dated May 25, 1984, from W. C. Jones to R. P. Denise, the licensee committed to modifying the containment purge procedure to provide for a shift supervisor review on the X/Q log. This had been done, and the NRC inspector had observed that the revised X/Q log was in use, and that the shift supervisor had been reviewing and initialing the X/Q readings as they were taken. In light of the licensee's action in this matter the NRC inspector considers Violation 8407-01 closed.

- e. On July 16-17, 1984, a regional based NRC inspector performed a safety inspection at the Fort Calhoun site of the UF₆ storage facility authorized under License SMC-1420. Within the scope of this inspection, no violations were observed and a completed NRC Form 591 attesting to this finding was left with the licensee for their records.
- f. On July 22, 1984, at about 9:58 p.m. the plant tripped due to noise spikes on RC temperature channels feeding RPS Channels A and C that caused actuation of the corresponding Thermal Margin/Low Pressure Trip Channels. All shutdown systems operated normally, and both the headquarters duty officer and the NRC inspector were contacted by the licensee. The noise spikes were caused by cycling of Control Switch HCV-155, Quench Tank Vent Valve, and the licensee was able to reproduce the spikes on Channel C during testing the following morning. Noise suppression devices were installed under MO 842775, and the licensee was continuing the investigation of the induced noise problem as per O/I 1958. This matter will be discussed in LER 84-013 to be submitted.

The NRC inspector observed the testing and corrective maintenance performed by the licensee. Preparations for restart were observed, and the NRC inspector observed the performance of ST-RPS-10, F.1, "Manual Trip Checks," and CI-RPS-1, "RPS Normal Operation-Switch Alignment and Light Checks." OP-1, "Master Checklist for Startup or Trip Recovery," was reviewed and the estimated critical boron concentration was calculated in accordance with Technical Data Book, Section V.1. The plant went critical at 11:15 a.m. the next morning and the licensee commenced power escalation to 98 percent to perform final power range testing in accordance with SP-PRCPT-1, "Post Refueling Core Physics Testing and Power Ascension." The NRC inspector will continue to follow the licensee's investigation into the noise spike problem as it impacted inputs to the RPS.

No violations or deviations were identified.

3. Surveillance Testing

The NRC inspector witnessed portions of the following surveillance tests:

- a. ST-RPS-1, F.3 (Monthly) Power Range Safety Channels Test (Channel C only)
- b. ST-RM-2, F.2 (Monthly) Process Monitor Checks (including VIAS actuation tests)
- c. ST-RM-2, F.7 (Annual) Post-Accident Main Steam Line Radiation Monitor (RM 064)
- d. ST-ACOUSTIC-1, F.1 (Monthly) Acoustic Monitor Circuit Check
- e. ST-SCEAPIS-1, F.1 (Refueling) Calibration of Secondary CEA Positioning
- f. ST-RPS-3, F.2 (Monthly) Reactor Coolant Low Flow Trip Check. This test also included performance of Calibration Procedure CP-RPS-3 to verify the new trip setpoint values entered for cycle 9.
- g. ST-ISI-RW-1, F.1 (Quarterly) Raw Water Valves Inservice Testing
- h. ST-ISI-RW-3, F.1 (Monthly) Raw Water Pump Inservice Inspection
- i. ST-ESF-6, F.2 (Monthly) Diesel Generator Check (Appendix A for D/G No. 1). During the performance of this test, two starts were attempted and the unit failed to come up-to-speed for loading. D/G No. 2 was tested for operability and D/G No. 1 was declared inoperable. MO 842629 was written to perform corrective maintenance of D/G No. 2.
- j. ST-ISI-CVCS-3, F.2 (Annual) CVCS Pump Test
- k. ST-CHEM-1, F.2 (Monthly) Chemical and Radiological Sample Data. The NRC inspector reviewed the results for boron analysis on the Boric Acid Storage Tank and the Safety Injection Refueling Water Tank (SIRWT). The SIRWT analysis showed the level to be less than 1700 ppm, and the plant emergency borated to bring the tank within specification in about two hours.
- l. ST-SI/CS-1, F.1 (Monthly) SI/CS Pumps and Valves (for SI-3C only)
- m. ST-SI/CS-1, F.3 (Refueling) HPSI System Leak Rate Determination
- n. ST-ESF-2, F.2 (Monthly) Channel "B" Safety Injection Actuation Signal Test
- o. ST-ESF-4, F.2 (Monthly) Channel "B" Containment Spray Logic
- p. ST-ESF-13, F.2 (Monthly) Channel "B" Recirculation Actuation Signal Test

In the above surveillance tests, the NRC inspector verified, where applicable, that:

- . testing was scheduled in accordance with Technical Specification requirements
- . procedures were being followed
- . calibrated test equipment was being used
- . qualified personnel were performing the tests
- . limiting conditions for operations were being met
- . test data were being accurately recorded

No violations or deviations were identified.

4. Maintenance Activities

The NRC inspector witnessed portions of the work performed on the following maintenance items:

- a. Maintenance Order (MO) 842312, "Main Steam Safety Valves." In response to IE Information Notice 84-33, this MO was written to check the cotter pins which secure the release nut on each of the main steam safety valves. Failure of these pins at other plants has allowed these release nuts to rotate and prevent the safety from fully closing after it has lifted. The NRC inspector accompanied the craftsmen who made the inspection and found that none had failed, but the licensee elected to replace the existing pins with stainless steel cotter pins. It was noted that the MO was signed off properly, that a copy of the Information Notice was attached, and that a qualified craftsman was assigned to the job.
- b. MO 845089, "RM 054B." Following the repair of "B" Steam Generator, the radiation alarm setpoint on the steam generator blowdown line had been raised. This MO was written because RM 054B was not actuating at 60,000 counts. Calibration Procedure CP-054B, Section III.F had been performed to calibrate the alarm board, and incorporate the proper stepoints based on three circulating water pumps running and a 20 gpm blowdown. The NRC inspector observed a portion of the work at the cabinet and noted that QC hold points were identified and observed, that the MO was properly signed off and assigned to qualified technicians.
- c. MO 840542, "Area Radiation Monitors." This was performed as post-refueling work to reset the containment area monitors to operating setpoints per the Technical Data Book. Monitors RM 070 through RM 075 were affected. The NRC inspector observed part of the work being performed and verified with the QC inspector that proper setpoints were being set.
- d. MR-FC-84-108, "Replacement/Reinsulation of Teflon Insulated Wire for Electrical Penetrations." This item was discussed in NRC Report 84-14,

paragraph 4.e, and the NRC inspector attended the Systems Acceptance Committee (SAC) meeting to review the final completed design package. It was noted that completed Forms D (Modification Design Transmittal), E (Modification Completion Report), F (Safety-Related Design Change Order), H (Pre-Installation Modification Control), and I (Post-Installation Modification Control) were attached along with the PRC approved installation procedure. The NRC inspector reviewed the 49 completed installation sheets for completeness and proper signoffs, and compared these sheets with the list of penetrations to be modified. Tag-out sheets were attached and reviewed, and Procedure Changes 12745, 12994, and 13018 were properly incorporated. Operations Memorandum 84-06 (FC-1110-84) was issued regarding insulation breakdown of containment penetrations following a Large Break Loss of Coolant Accident (LBLOCA). This memo established administrative controls for handling containment diaphragm operated valves in the event of electrical penetration failure following LBLOCA. The wiring for these valves was not part of the qualification effort because their failed position was also their required safeguards position. If for some reason these valves were to go to their non-safeguards position, air to these valve operators would be secured from outside containment.

- e. MO 842354, "RC Temperature Channel." Reactor Coolant Temperature Channel C/T1-112C was noted by the operators to be experiencing a 12° deviation higher than the other corresponding channels. The MO was filled out and signed off properly, and QC was called out to verify repairs and operability. The NRC inspector observed troubleshooting being done at the transmitter junction box that had been relocated to the penetration room (Room 57) during the last outage.
- f. MO 842705, "FP-1A." It was found that the recirculation line from Fire Pump FP-1A discharge to strainer leaked at the elbow fitting by FP-300. The NRC inspector reviewed the MO and verified that it was filled out and approved properly, that QC requirements were identified, and that Technical Specification Section 2.19 was referenced. The NRC inspector observed the tags being hung to isolate the pipe, the phone call to inform the ANI, and the installation of Jumper 84-082 to block the mercury switch to the diesel fire pump. It was noted that qualified craftsmen were assigned to the task, and that a new pipe and elbow fitting were installed to eliminate the leak.
- g. MO 842688, "AC-338." It was found by the auxiliary building operator, that AC-338, the relief valve on Charging Pump CH-1C, was leaking through. The NRC inspector reviewed the MO for signoffs and approvals, Technical Specification reference, operability of redundant equipment, and tag-out assignment. Maintenance Procedure MP-RV-1, "Safety/Relief Valve Maintenance," was attached, PRC approved, and identified QC hold points to be observed. When the craftsman went to the job he found that the

relief could not be removed because it was welded in place. An EEAR was submitted and processed, and SRDCO 84-64 was issued to provide for installation of a union fitting in the pipe. The NRC inspector reviewed this package and noted that a PRC approved procedure (with QC hold points) was attached, that the ALARA checklist had been completed, and that Forms A and H were completed and signed off. New Tag-Out 84-1336 was assigned to this work, and the NRC inspector inspected the relief valve once it was removed, decontaminated, and brought out into the shop.

- h. MO 842748, "No. 1 Diesel Generator." The timer and battery on the No. 1 Diesel Generator Air Compressor had to be replaced. The NRC inspector observed final portions of the work and witnessed the operability test with the plant QC inspector. The MO was reviewed for signoffs and approvals, Technical Specification reference, QC hold points, spare parts data, and proper assignment to qualified craftsmen.

No violations or deviations were identified.

5. Plant Startup Activities

During this inspection period the licensee completed repair activities on the "B" Steam Generator and made final preparations for startup. The NRC inspector reviewed the prerequisites and precautions, and observed portions of OI-RC-2B, "Reactor Coolant Vent and Leak Test Instruction." This review included Procedure Change 13038 that incorporated a 350⁰ "soak" on the steam generators to allow contaminants to come into solution. Maximum blowdown was to be established while continuous sampling was to be performed to determine when the contaminants had been reduced and stabilized. It was later determined in consultation with the NSSS vendor that this "soak" could be performed at 400⁰F to allow the plant hydrostatic test to be done concurrently. On July 4, 1984, the licensee performed the 2100 pound primary hydrostatic test satisfactorily. The NRC inspector attended the prebriefing meeting, reviewed the prerequisites of OP-1, "Master Checklist for Startup or Trip Recovery," Steps IV.A.1 through IV.A.3, and observed the pressurization from the control room. During the steam generator "soak", the NRC inspector reviewed the plots of tests for sodium and copper that were maintained over about a 30-hour period. With the sampling for sodium, there was a clear rise-in-level indicating that the contaminants were coming into solution, followed by a dropping off and leveling out as the maximum blowdown flow had effect. During the hydrostatic test the NRC inspector toured the containment with the Supervisor of Maintenance and observed the various teams searching for leaks. It was noted that a consolidated list of leaks found was prepared and maintenance teams were dispatched to the containment to make necessary repairs. A final inspection was made at the end of the 4-hour pressurization to verify repairs made and search for any additional problems.

In preparation for startup, the NRC inspector made a final closeout tour of the containment with the QC inspector. Operations personnel were observed

performing final containment closure in accordance with OI-CO-1-CL-A, "Containment Closure Checks." The NRC inspector reviewed the final prerequisites in OP-1 and verified that all prerequisites had been met for startup in SP-PRCPT-1, "Post Refueling Core Physics Testing and Power Ascension." Once the final PRC review signoff was complete, the plant commenced pulling rods to go critical at 11:28 a.m. on July 8, 1984. The plant was critical at 6:37 p.m. and critical boron concentration was within acceptable limits of the predicted value. The NRC inspector observed the startup and reviewed the estimated critical boron concentration calculations worksheet per Technical Data Book, Section V.1.b.

Low power physics tests for cycle 9 were covered by SP-PRCPT-1, Sections F.2 through F.12. The NRC inspector observed various sections of these tests being performed over several days, and verified that the results were within the acceptance criteria listed in Appendix D to the procedure. These sections were reviewed and signed off by the PRC on July 11, 1984, after they were completed. Of particular interest to the NRC inspector and the licensee was the measurement of the isothermal temperature coefficient and the calculation of the moderator temperature coefficient (MTC). The test was performed three times and provided an MTC of $+4.6 \times 10^{-5} \Delta p / ^\circ F$, just slightly within the Technical Specification limit of $+5.0 \times 10^{-5} \Delta p / ^\circ F$. The NRC inspector observed these tests and discussed the preliminary results with the licensee.

The turbine was rolled the evening of July 12, 1984, and power escalation commenced under Section F.13 of SP-PRCPT-1. The NRC inspector observed testing being performed at 30, 66, and 98 percent power and reviewed the results from SP-FAUD-1, "Fuel Assembly Uplift Condition Detection," ST-RCF-1, F.1, "Reactor Coolant System Flow Rate Determination," and SP-CTPC-1, "Core Thermal Power Calculation - NSSS Calorimetric."

The NRC inspector verified that the additional chemistry tests on the steam generators were being performed in accordance with NRC letter dated June 22, 1984, from J. T. Collins to W. C. Jones as a result of the recent tube failure in RC-2B. The NRC inspector observed the boron sample being taken and the analysis being performed in accordance with Chemistry Procedure CMP-4.6.8, "Steam Generator Primary - Secondary Leak Rate."

At the close of this inspection period the plant was operating at a nominal 98 percent power and all physics testing was completed except for an additional moderator temperature coefficient determination to be done in accordance with ST-MTC-1, F.2, "Moderator Temperature Coefficient," within 500 MWD/MTU of initial operation after each refueling.

No violations or deviations were identified.

6. OPPD Reorganization

On July 1, 1984, the licensee implemented a reorganization that established a new division of nuclear production separate from the division of production operations. Mr. R. L. Andrews has assumed the duties of Division Manager, Nuclear Production, and this change to Section 5 of the Technical Specifications had been submitted to the NRC prior to this change. Pending issuance of the Technical Specification amendment incorporating these organizational changes, this item will remain unresolved. (285/8416-01)

7. Exit Interview

The NRC inspector, along with Mr. Dorwin Hunter, Chief, Reactor Project Branch 2 and Mr. William Brown, Regional Counsel, met with licensee representatives on August 3, 1984, to summarize the scope and findings of the inspection.