

APPENDIX B

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-313/88-06
50-368/88-06

Licenses: DPR-51
NPF-6

Dockets: 50-313
50-368

Licensee: Arkansas Power & Light Company
P. O. Box 551
Little Rock, Arkansas 72203

Facility Name: Arkansas Nuclear One (ANO), Units 1 and 2

Inspection At: ANO Site, Russellville, Arkansas

Inspection Conducted: February 22 through March 27, 1988

Inspectors: W D Johnson 3/30/88
W. D. Johnson, Senior Resident Reactor Inspector Date

C C Harbuck 3/30/88
C. C. Harbuck, Resident Reactor Inspector Date

Dwight J. Chamberlain for 4/13/88
R. C. Haag, Reactor Inspector Date

Approved: Dwight J. Chamberlain 4/13/88
D. D. Chamberlain, Chief, Reactor Project Section A, Division of Reactor Projects Date

Inspection Summary

Inspection Conducted February 22 through March 27, 1988 (Report 50-313/88-06)

Areas Inspected: Routine, unannounced inspection including operational safety verification, maintenance, surveillance, allegation followup, and generic letter followup.

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

Inspection Conducted February 22 through March 27, 1988 (Report 50-368/88-06)

Areas Inspected: Routine, unannounced inspection of operational safety verification, maintenance, surveillance, allegation followup, refueling activities, pressurizer repair, event followup, and generic letter followup.

Results: Within the eight areas inspected, two violations were identified (performance of maintenance without an approved job order, paragraph 2, and inadequate cleanliness controls on the fuel handling bridge during refueling activities, paragraph 3).

DETAILS1. Persons Contacted

- J. Levine, Executive Director, ANO Site Operations
- B. Baker, Plant Modifications Manager
- A. Cox, Unit 1 Operations Superintendent
- E. Ewing, General Manager, Technical Support
- J. GoBell, Mechanical Maintenance Engineer
- L. Gulick, Unit 2 Operations Superintendent
- C. Halbert, Engineering Supervisor
- D. Harrison, Engineer
- H. Hollis, Security Superintendent
- *D. Howard, Licensing Manager
- L. Humphrey, General Manager, Nuclear Quality
- R. Lane, Engineering Manager
- *D. Lomax, Plant Licensing Supervisor
- A. McGregor, Engineering Services Supervisor
- *J. McWilliams, Maintenance Manager
- *P. Michalk, Licensing Engineer
- V. Pettus, Mechanical Maintenance Superintendent
- D. Provencher, Quality Assurance Supervisor
- *S. Quennoz, General Manager, Plant Operations
- P. Rogers, Special Projects Coordinator
- C. Taylor, Unit 2 Operations Technical Support Supervisor
- *J. Taylor-Brown, Quality Control Superintendent
- L. Taylor, Special Projects Coordinator
- *J. Vandergrift, Operations Manager

*Present at exit interview.

The NRC inspectors also contacted other plant personnel, including operators, technicians, and administrative personnel.

2. Monthly Maintenance Observation (Units 1 and 2)

Station maintenance activities for the safety-related systems and components listed below were observed in order to ascertain whether they were being conducted in accordance with approved procedures, Regulatory Guides, and industry codes or standards and in conformance with Technical Specifications.

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from service, approvals were obtained prior to initiating the work, activities were accomplished using approved procedures and were inspected as applicable, functional testing and/or calibrations were performed prior to returning components or systems to service, quality control records

were maintained, activities were accomplished by qualified personnel, parts and materials used were properly certified, radiological controls were implemented, and fire prevention controls were implemented.

Work requests were reviewed to determine the status of outstanding jobs and to ensure that priority is being assigned to safety-related equipment maintenance which may affect system performance.

The following maintenance activities were observed:

- Installation of mounting brackets for new core protection calculator cabinets (Job Order 746016-1, Design Change 87-2075C)
- Fit up of a portion of the auxiliary spray line piping (2CCA-16-2") (Job Order 733936-76, Design Change 82-2072)
- Installation of exhaust manifolds with new design seal rings on Emergency Diesel Generator 2K4A
- Fit up of a portion of pressurizer spray line piping (2CCA-15-4") at Field Weld 43 adjacent to Valve 2CV-5655, one of the new pressurizer spray isolation valves (DCP 82-2072)
- Preventive maintenance and testing of a breaker for emergency feedwater pump motor (Job Order 749198, Procedure 2307.27)
- Removal of unused handswitches and indicating lights from control room Panel 2C16 (Plant Change 86-0153)
- Modification to the valve operator for service water to auxiliary cooling water Valve 2CV-1425-1 (Job Order 745244, Plant Change 88-0228)
- Inspection of wiring in plant protection system cabinet (Job Order 751231)
- Replacement of Potter Brumfield MDR relays (Job Order 740128, Design Package 84-2063)

Job Order 740128 authorized the replacement of red channel relays listed on an attached multi-component list using Work Plan 2409.05. The NRC inspector observed the completion of the replacement for Relay 63X/4926 and the initial steps of the replacement for Relay 94-0340-2. Work was stopped on the second relay when the NRC inspector noted that both these relays are components in the green channel and were not authorized for replacement by Job Order 740128. It was pointed out to the NRC inspector that shift supervisor approval for the replacement of these relays had been granted and documented as required by Work Plan 2409.05. A job order for replacement of the green channel relays per Work Plan 2409.05 and Design Change Package 84-2063 was subsequently issued and work was resumed.

The licensee's performance of work on Relays 63X/4926 and 94-0340-2 was conducted without an approved job order, contrary to the requirements of Procedure 1000.24, Control of Maintenance, and is considered a violation. (368/8806-01)

3. Refueling Activities (Unit 2)

The NRC inspector observed the removal of several fuel assemblies from the reactor core and their transfer to the spent fuel pool. The operations observed were well coordinated and the operators appeared to be properly trained. A nuclear engineering representative was present on the fuel handling bridge.

On February 29, 1988, the NRC inspector observed the following housekeeping discrepancies on the fuel handling bridge:

- ° Several tools were laying loose on the floor of the bridge. These included a hammer, a screwdriver, a flashlight, a pair of channel lock pliers, and a strap wrench.
- ° Loose debris such as wires and electrical terminal lugs were observed on the floor of the bridge.
- ° There was an excessive amount of dirt and dust on the floor of the bridge.

These discrepancies were pointed out to the senior reactor operator in charge of fuel handling and they were promptly corrected.

Procedure 1000.18, "Housekeeping," requires that the area above the reactor cavity be maintained in accordance with Housekeeping Level I requirements when the reactor vessel head is removed. This procedure requires that Housekeeping Level I areas be clean such that dirt or grit is minimized within the zone. It further requires that tools be secured by lanyards. The licensee's failure to meet these cleanliness requirements on the fuel handling bridge is considered a violation. (368/8806-02)

The NRC inspector observed fuel handling during defueling in the spent fuel pool (SFP) area. Communications with the control room and the reactor building fuel handling bridge were satisfactory. The SFP bridge operator was found to be alert and cautious and performed his duties in a correct manner. A copy of the fuel shuffle procedure was present and was referred to, step by step, by the bridge operator. The NRC inspectors concluded that fuel handling operations in the SFP were adequate.

The NRC inspector observed fuel loading operations from the refueling bridge in the Unit 2 reactor building. It was verified that applicable procedures were followed, that communications were adequate, and that the personnel operating the bridge were properly qualified. Good technique and patience were demonstrated during the placement of a fuel assembly

which would not easily go into position. The housekeeping problems previously noted by the NRC inspector during defueling had been corrected.

Refueling was completed satisfactorily with no fuel mishandling having occurred.

4. Operational Safety Verification (Units 1 and 2)

The NRC inspectors observed control room operations, reviewed applicable logs, and conducted discussions with control room operators. The NRC inspectors verified the operability of selected emergency systems, reviewed tagout records, and ensured that maintenance requests had been initiated for equipment in need of maintenance. The NRC inspectors made spot checks to verify that the physical security plan was being implemented. The NRC inspectors verified implementation of radiation protection controls during the observation of plant activities.

The NRC inspectors toured accessible areas of both units to observe plant equipment conditions, including potential fire hazards, fluid leaks, and excessive vibration. The NRC inspectors also observed plant housekeeping and cleanliness conditions during the tours.

The NRC inspectors walked down the accessible portions of the Unit 1 Decay Heat Removal/Low Pressure Injection System to verify operability. The walkdown was performed using Procedure 1104.04 and Drawing M-232. The deficiencies listed below were found during the walkdown. These items had no effect on system operability.

- Manual Valves DH-15 and SS-542 were locked but were not required to be locked by the procedure. DH-15 is a Category E valve. The procedure will be changed to reflect its locked status. The lock on SS-542 was not required and was removed by the licensee.
- Valves CA-61 and DH-1012 had packing leaks. Job requests were subsequently issued by the licensee for repair.
- Scaffolding was noted which appeared unnecessary because the associated work was completed. One was observed in the lower north piping room associated with Job Order 742019. It had been erected on October 14, 1987. Another was observed in the B decay heat vault. It was erected in January 1988 as 30-day scaffolding associated with Job Order 729491. Both scaffolds were removed.
- The O-rings on terminal boxes for Borated Water Storage Tank (BWST) level transmitters LT-1411 and LT-1421 appeared to be dried and cracked. A job request was issued to replace them.

- Heat tracing at sodium hydroxide tank level transmitter isolation valve CA-1616B appeared to be poorly installed and deteriorated. Job requests were written to evaluate the problem and determine repairs needed.
- Valves CV-1617 and DH-1409 had packing leaks. Deficiency tags on the valves indicated that the leaks had been identified about a year previously. Job orders were issued to correct the leaks. Additionally, the leakage from CV-1617 was not contained, creating a potential contamination and housekeeping problem in the T-16 tank room below the valve. The licensee installed a tygon hose to direct the leakage to a floor drain.
- Valve CA-89 was labeled incorrectly. The label was replaced with one with the proper description.
- DH-1405, an isolation valve for a local discharge pressure gage on the B decay removal heat pump was closed and the gage was missing. The procedure specified the position as open. A job request to install the gage was issued.
- Valve DH-1020D, a drain valve off an instrument line in the green train LPI header did not have a cap on the pipe end below the valve as required by the procedure and as depicted by the Piping and Instrumentation Diagram, M-232. The licensee informed the NRC inspectors that, since the October 1987 maintenance outage, leakage, apparently from the core flood tanks past Check Valves DH-18, DH13B, or both, had been pressurizing the green train LPI discharge header. Whenever pressure reached about 100 psig, operations had been venting the header to a filtered contaminated liquid 5 gallon poly bottle via a clear tygon hose attached to the drain pipe. Apparently, the hose attachment had become continuous. Operations was subsequently directed to cap the pipe end as directed by the procedure, and to remove it only as needed for venting.

Through discussions with the licensee and a review of Procedure 1102.02, "Plant Startup," it was determined that performance of the entire DH/LPI lineup, Attachment A of Procedure 1104.04, is not required by the procedure following a refueling outage and had not been done completely at the conclusion of the last refueling outage in December 1986.

Following discussions with the NRC inspector, the licensee performed the outside reactor building portion of the decay heat removal system lineup procedure. No operability problems were identified.

Additionally, the licensee plans to revise the startup procedure to require performance of Attachment A of Procedure 1104.04 prior to plant startup following refueling.

During a tour of the Unit 1 control room, the NRC inspector observed that annunciator "RCP Cavity Seal Press Hi/Lo" was illuminated. The cause of

the alarm was an abnormal pressure on the upper seal cavity of Reactor Coolant Pump (RCP) P32C. This annunciator is common to all RCP seal cavity pressure alarms and has no reflash capability. The NRC inspectors pointed out to the shift supervisor that with one alarm in, all other seal alarms were ineffective. Subsequently, a job request (JR 799797) was issued on March 18, 1988, to adjust the high pressure alarm set point for the upper seal pressure of RCP P32C in order to restore alarm capability to that seal cavity and concurrently for all the other RCP seal cavities.

During a tour of the Unit 2 containment building on February 22, 1988, the NRC inspector observed a pinhole leak on the service water supply header to Containment Cooling Unit 2VSF-1C. The Unit 2 shift supervisor was informed. Checks by licensee personnel did not identify a leak in the location described by the NRC inspector. During an inadvertent engineered safeguards system actuation on March 10, 1988, the service water header in the containment building was pressurized. At this time, licensee personnel identified a leak on the service water header at the location previously identified by the NRC inspector. The size of the hole had increased to about an eighth of an inch in diameter. The licensee is planning to replace the 90° elbow which includes the leak.

These reviews and observations were conducted to verify that facility operations were in conformance with the requirements established under Technical Specifications, the Code of Federal Regulations, and licensee administrative procedures.

No violations or deviations were identified.

5. Monthly Surveillance Observation (Units 1 and 2)

The NRC inspector observed the Technical Specification required surveillance testing on various plant components listed below and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting conditions for operation were met, that removal and restoration of the affected components were accomplished, that test results conformed with Technical Specifications and procedure requirements, that test results were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The NRC inspectors witnessed portions of the following test activities:

- ° North piping penetration room emergency ventilation exhaust Radiation Monitor 2RI-2120 (Procedure 1304.27)
- ° Quarterly test of vital battery 2D11 to demonstrate operability following the performance of discharge testing, cyclic maintenance, and recharging (Procedure 2403.24, Job Order 748631)

- ° Reactor protection system channel B test, including trip testing of reactor AC trip breaker "B" (Procedure 1304.038, Job Order 751755)
- ° Emergency feedwater system control valve stroke testing (Procedure 1106.06, Supplement III)
- ° Emergency Diesel Generator 2K4A 18-month surveillance of 24-hour load test (Procedure 2104.36, Supplement III)

No violations or deviations were identified.

6. Allegation Followup (4-87-A-0033)

The purpose of this portion of the inspection was to determine the safety significance of the allegation reviewed.

On April 29, 1988, it was alleged that the shift administrative assistants (SAAs) in both units were recording in logs of station parameters which should only be recorded by licensed operators. The NRC inspector determined that although SAAs did record some logs, it was not inappropriate for them to do so. The applicable licensee procedures did not specifically prohibit the SAAs from taking those logs. The following concerns were noted by the NRC inspector:

- ° Paragraph 6.8 of Procedure 1015.01, "Conduct of Operation," describes the duties and responsibilities of the SAA position. Log taking is not listed. After NRC discussions with the operations manager, the licensee committed to revise this procedure to specify that log taking is an SAA duty and responsibility.
- ° The two units were inconsistent regarding which logs were the SAA's responsibility. In Unit 1, the SAAs routinely record the Super Particulate Iodine and Noble Gas (SPING) and Gaseous Effluent Radiation Monitory System (GERMS) data on the radiation monitor logs. In addition to this data, the SAAs also complete the process radiation monitor log in Unit 2.
- ° Occasionally, by informal agreement, the SAAs are allowed to record log readings of the area and process radiation monitors in Unit 1 and of the area radiation monitors in Unit 2 for the waste control operator (WCO). This is done if the WCO is unable to come to the control room due to an ongoing evolution requiring his presence elsewhere. The licensee stated this was not considered a problem because the logs were reviewed each shift at turnover by the WCO and the shift supervisor and because allowable limits for each reading are printed on the log sheet. However, the NRC inspector expressed concern about the adequacy of training to enable the SAAs to correctly interpret abnormal process and area radiation monitor readings.

Based on the review performed during this inspection, this allegation although partially substantiated, did not identify any violations or deviations. The review of the procedure change discussed above and the review of an evaluation of the adequacy of SAA qualifications is considered an open item (313/8806-01; 368/8806-03).

This allegation is considered closed.

7. Mockup For Pressurizer Heater Repair (Unit 2)

The NRC inspector observed portions of the mockup associated with the permanent repair of pressurizer heater penetrations X-1 and T-4. The purpose of this full scale mockup was to qualify onsite welding personnel and to demonstrate the adequacy of various aspects of the repair procedure. Babcock & Wilcox, the vendor contracted to perform the repairs, has previously qualified the procedures, equipment, and personnel necessary to perform the majority of the repair work. The licensee witnessed these earlier qualifications performed at B&W's facility.

Welders were qualified, during mockup training, for the structural welds which join the new inconel nozzles to the inconel buttering. The mockup consisted of a carbon steel plate approximately 4 inches thick with the nozzle and buttering installed. Each welder was required to perform two qualification welds, one with no obstructions and the other with the plate fitted into a confined area with dimensions and interferences similar to those encountered in the pressurizer lower head area.

No violations or deviations were identified.

8. Followup of Onsite Event (Unit 2)

On March 13, 1988, while performing ultrasonic inservice inspection (ISI) of the Unit 2 reactor pressure vessel, a locking pin necessary for maintaining control of the telescoping mast of the Programmed and Remote (PAR) ultrasonic testing apparatus fell out. This resulted in the dropping of the remaining portion of the telescoping mast approximately 10 feet and the impact of the lower inspection boom on the edge of the flow baffle skirt, the breaking off of the lower inspection boom, and a secondary fall and impact of the inspection boom on the clad surface of the pressure vessel lower head.

The NRC inspectors reviewed the licensee's followup video camera inspections at the points of impact and directly examined the broken inspection boom. Due to the poor quality images of the impact markings on the cladding, a conference call between the licensee, the ISI and engineering contractor (Combustion Engineering), the Office of Nuclear Reactor Regulation (NRR), NRC Region IV, and the onsite NRC inspectors was held on March 17, 1988. In this call, the parties discussed the analysis performed by Combustion Engineering which demonstrated that the potential (worse case) damage to the clad would not have been significant. The licensee's analysis methodology and inspection of the incident were

acceptable for demonstrating the expected affect of the impacts. However, the licensee agreed to supply NRR with details regarding the actual calculations performed by CE.

Due to the damage to the PAR testing apparatus, ultrasonic inspection of the pressure vessel was suspended until the next refueling outage. This is acceptable because it is planned to occur prior to the end of the current 10-year inservice inspection program interval (March 1990).

No violations or deviations were identified.

9. Followup on Generic Letter 86-07 (Units 1 and 2)

Generic Letter 86-07 was issued March 20, 1986, and was entitled, "Transmittal of NUREG-1190 Regarding the San Onofre Unit 1 Loss of Power and Water Hammer Event." This generic letter was provided for information only and included no reporting requirements. Much of the licensee's response to this issue was taken following receipt of IE Information Notice 86-01. Licensee actions included check valve inspections and the addition of check valves to the preventive maintenance program. The NRC inspectors' review of this generic letter centered on verification that the San Onofre event was covered in operator training as a part of the licensee's program for feedback of industry operating experience to the plant staff. The NRC inspectors found that this abnormal event had been covered extensively in operator requalification training for both units.

No violations or deviations were identified.

10. Exit Interview

The NRC inspectors met with Mr. S. M. Quennoz, General Manager, Plant Operations, and other members of the AP&L staff at the end of inspection. At this meeting, the NRC inspectors summarized the scope of the inspection and the findings. The NRC inspectors noted that the licensee's corrective action in response to Violation 313/8429-05 was inadequate to prevent recurrence of a similar violation in Unit 2 during this inspection period. Both of these violations involved inadequate control of loose items on the fuel handling bridge during refueling activities.