U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report Nos. 50-313/79-12
50-368/79-12

Docket No. 50-313 License No. DPR-51

50-368 License No. NPF-6

Licensee: Arkansas Power and 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: June 18 - July 7, 1979

Inspectors: G S Madison for — 7/19/79
W. D. Johnson, Resident Reactor Inspector — Date

Robert G Spangler — 7/18/79
R. G. Spangler, Reactor Inspector — Date

Robert G Spangler for — 7/18/79
G. L. Constable, Reactor Inspector — Date

R. Smith — 7/12/79
R. Smith, Reactor Inspector — Date

Approved By: G S Madison for — 7/19/79
T. F. Westerman, Chief, Reactor Projects Section — Date

Inspection Summary

Inspection conducted during period of June 18 - July 7, 1979 (Report No. 50-313/79-12)

Areas Inspected: Routine, announced inspection of surveillance (refueling), plant operations after refueling, operational transients, emergency feedwater system testing, job orders and training. The inspection involved 290 inspector-hours on-site by four (4) NRC inspectors.

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Results: Within the six areas inspected, one item of noncompliance was identified (Deficiency - failure to adhere to procedure, paragraph 8).

Inspection conducted during period of June 18 - July 7, 1979 (Report No. 50-368/79-12)

Areas Inspected: Routine, announced inspection of plant operations, operational transients, followup on IE Bulletin 79-06B, and training. The inspection involved 68 inspector-hours on-site by three (3) NRC inspectors.

Results: Within the four areas inspected, no items of noncompliance were identified.

DETAILS

1. Persons Contacted

Arkansas Power & Light Company Employees

J. P. O'Hanlon, ANO Plant Manager
G. H. Miller, Engineering & Technical Support Manager
L. Alexander, QC Engineer
B. A. Baker, Operations Superintendent
T. N. Cogburn, Nuclear Engineer
E. C. Ewing, Production Startup Supervisor
T. Holcomb, Scheduler
B. A. Terwilliger, Operations and Maintenance Manager
J. Robertson, ANO-1 Operations Supervisor
S. Petzel, Licensing Engineer
F. Foster, Plant Administrative Manager
M. Stroud, Electrical Maintenance Supervisor
R. Elder, I&C Supervisor
J. McWilliams, Planning & Scheduling Supervisor
J. Vandergrift, Training Supervisor
T. Green, Training Coordinator
D. Trimble, Licensing Manager
C. Shively, Plant Performance Engineer

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

2. Surveillance - Refueling (Unit 1)

The inspector witnessed portions of the performance test for the steam driven emergency feedwater pump to determine that:

a. Minimum crew requirements were met

b. Test prerequisites were completed

c. Test equipment was in calibration

d. Data was properly recorded and analyzed

e. Procedures were in use

The above test was conducted under an approved work plan number 83. Three points from the design pump curve were verified by this test. The inspector determined that the above criteria were satisfied and identified no items of noncompliance or deviations.

3. Review of Plant Operations after Refueling (Unit 1)

The inspectors observed the licensee's activities in preparation for and during the ANO Unit 1 plant heatup commencing on June 14, 1979. These observations consisted in part of the following:

a. Review of the changes to the licensee's administrative controls for startup.

b. Review of the licensee's records to determine that safety systems were aligned in the correct manner prior to plant heatup.

c. Review of the licensee's update of procedures for cycle four physics data.

d. Direct observation of the control room operators from the initiation of plant heatup to full power operation.

No items of noncompliance or deviations were identified.

4. Operational Occurrence (Unit 1)

On June 16, 1979, as main steam pressures exceeded 650 psi, the Steamline Break Instrument and Control System (SLBIC) automatically armed and immediately tripped on the A OTSG causing a feedwater isolation on the A OTSG. The unit operators implemented the emergency procedure for loss of feedwater to an OTSG and started the electric emergency feedwater pump P7B. The Assistant Operations Superintendent determined that the SLBIC actuation occurred because the root valves on the A OTSG pressure sensing lines were closed. This gave a low steamline pressure input to the SLBIC logic which operated correctly. These valves had been positioned open prior to heatup, however, they were apparently inadvertently closed when the steam trap isolation valves located next to them were closed to reduce heat losses from the system. The root valves were reopened and SLBIC was reset. In order to prevent a recurrence of this event, the root valve handwheels were removed and wired to the valve body and an identifying tag was installed for these valves. The licensee later reviewed the remainder of the plant layout and determined that a similar event could not occur in the remaining safety systems. However, it does appear that valve identification and tagging methods could be improved and this item will be an open item (313/79-12-01). P7B was secured after a twenty minute run and the control room then received a report that the pump thrust bearing had failed. The pump was declared inoperable and the heatup stopped at 2165 psi and 490°F. It was found that the thrust bearing had been incorrectly assembled during the preventive maintenance (PM) performed during the refueling outage. The pump had been successfully run for one hour following the PM during surveillance testing prior to the heatup. Plant management has reviewed these events and implemented changes in the maintenance procedure for P7B to prevent a recurrence of the above.

5. Observation of Operating Transient (Unit 1)

At about 1630 hours on June 23, 1979 with reactor power at 7%, the operating

main feed pump tripped. The auxiliary feed pump was started manually and the electric motor driven emergency feed pump started automatically on low steam generator level. The operators reduced reactor power to 2%, stabilized plant conditions, and secured the motor driven emergency feed pump. At the time of this event, the steam driven emergency feed pump was out of service for maintenance. The cause of the main feed pump trip was not determined. It was assumed to have been caused by a foreign particle in the lube oil system. The lube oil system filters have been rotated more frequently than normal since restart of the pump.

Operator action in this transient was judged to be timely, effective and in accordance with procedures. No items of noncompliance or deviations were identified.

6. Emergency Feedwater Flow Test (Unit 1)

The inspectors observed the performance of Work Plan Number 79 entitled, "Flow Test - Emergency Feedwater to the Steam Generators with Manual ICS Override," on June 24, 1979. This procedure was performed in order to demonstrate adequate flow of emergency feedwater to both steam generators at 10-15% reactor power with manual control overriding the integrated control system.

The inspectors observed that the test prerequisites and the required initial conditions were satisfied. The test was performed in accordance with the test procedure, as amended. Review of the test data indicated that the test objectives and the acceptance criteria were satisfied with the exception of the flow rate from the steam turbine driven emergency feedwater pump (P7A). The Plant Safety Committee (PSC) recommended that reactor power be restricted to 50% until the P7A flow rate discrepancy was resolved.

On June 26, 1979, the PSC concluded the demonstrated P7A flow rate was acceptable and recommended that the 50% power restriction be removed. The PSC based their conclusion on an analysis by Babcock & Wilcox which demonstrated the adequacy of 500 gallons per minute of emergency feedwater delivered to the two steam generators. (B&W letter to AP&L, ANO-79-97, dated June 26, 1979)

The inspectors identified no items of noncompliance or deviations associated with this test.

7. Emergency Feedwater Pump Lengthened Run - Time Tests (Unit 1)

The inspectors witnessed portions of the performance of Work Plan Number 84 entitled, "Demonstrating Lengthened Run - Time Reliability of P-7A and P-7B." This test included a 72 hour run of the steam turbine driven emergency feedwater pump (P7A) and a 35 hour run of the electric motor driven emergency feedwater pump (P7B). A review of the test data indicated

that the test acceptance criteria were met with the exception of the P7B pump outboard bearing oil temperature. This temperature rose to 188°F and then apparently stabilized at 185°F. After about 15 hours of run time, cooling water was supplied to this bearing to reduce its temperature to about 128°F. No items of noncompliance or deviations were identified.

8. Processing of Job Orders (Unit 1)

On June 27, 1979, the inspector reviewed the Job Orders for selected completed maintenance items. The job order forms were found to be only partially completed, contrary to the requirements of procedure 1004.14 entitled, "Initiation and Processing of Job Orders." The job orders reviewed and the missing information item numbers are listed below:

Job Order Number	Item Numbers Missing Information
3473-R3	15, 16, 17, 19-25
3475-R3	15, 17, 19-25
3476-R3	19-25
3479-R3	17, 19-25
3480-R3	17, 19-25

OP 1004.14, Revision 2, contains the requirements for initiating and processing of job orders. Various sections of this procedure contain specific requirements for the completion of portions of the Job Order form. The Job Orders (JO's) listed above had the following discrepancies:

a. Section 4.11 requires that the Shift Supervisor enter the assigned tag number in item 16 if tagging is required. This was omitted for one of the above JO's.

b. Section 4.15 requires that the Working Copy of the JO be given to the assigned person responsible for completing the job. For the above JO's, this apparently was not done since the working copies were still attached to the original JO in the Control Room.

c. Section 4.15 states that the assigned person does not start work until the JO is complete through item 18. For the above JO's, item 18 (Shift Supervisor's work authorization) was completed, but item 17 (noting date and time by which Technical Specification operability must be re-established) was blank for four of the five JO's.

d. Section 4.15 requires that the assigned person complete items 18 through 23 of the JO when the job is complete. These items include 19) Detailed Description of Work Performed; 20) Material Used; 21) Results of Post Maintenance Checkout/Test; 22) Comments; and 23) Assigned person's signature indicating job completion. These items were all blank for the above JO's.

e. Section 4.17 requires completion of item 24, which documents any required post-maintenance testing. Although post-maintenance testing was required and performed for these jobs, item 24 was blank for the above JO's.

f. Section 4.17 requires that the Shift Supervisor complete item 25 of the JO form when normal plant/system conditions are restored. This item was blank for the above JO's.

The inspector informed plant management of these discrepancies and expressed concern that the job order procedure, which had been revised in response to IE Bulletin 79-05A, had not been properly implemented. The licensee took prompt steps to correct the specific deficiencies and to ensure, through training sessions, that plant personnel (both operations and maintenance) were aware of the job order processing requirements. Since corrective steps and corrective steps to avoid further noncompliance were completed during the period of this inspection, no written response to this item is required.

9. Training and Requalification Training (Units 1 and 2)

The inspector commenced a review of records for the training and requalification training of plant staff and licensed operators for Units 1 and 2. This review included changes in the requalification training plans. This inspection effort will be completed during the next inspection.

10. Operating Transient (Unit 2)

At 0724 hours on June 23, 1979 with reactor power at about 40%, the reactor was tripped manually following a turbine trip and a condensate pump trip. Emergency feedwater actuated on low steam generator level. The turbine trip was traced to a differential current relay trip on the C phase of the main transformer. This relay is designed to compare the C phase at the generator output to the C phase at the main transformer output with a contribution from the A phase to correct for the Δ-Y wiring of the main transformer. Due to a wiring error in the relay inputs, this relay had an input from the B phase instead of the A phase. When generator output got high enough (this was the highest power level reached to date) the relay trip set point was reached. Similar wiring errors were found on the differential current relays for the other two phases These have been corrected. No items of noncompliance or deviations were identified.

11. Followup on IE Bulletin 79-06B, Review of Operational Errors and System Misalignments Identified During the Three Mile Island Incident (Unit 2)

The purpose of this inspection effort was to verify actions taken by the licensee to inform licensed operators about the Three Mile Island incident and the preventive measures that have been taken at Arkansas Nuclear One, Unit 2.

Through discussions with members of training staff and licensed operators, it was learned that the following actions have been taken.

- Many procedure changes have been made, including additional checks of valves and breakers in many safety systems. These procedure changes are routinely reviewed by each licensed operator.

- A lecture on the details of Three Mile Island incident was given to all licensed personnel.

- Informal on-shift discussions have been held regarding procedure changes to ensure that emergency safety features are not overriden, except as specifically permitted.

The operators, in general, felt that the training they had received was adequate.

12. Review of Plant Operations

The inspector observed general plant operations of Unit 1 and Unit 2. The purpose of this inspection effort was to verify that the units were operated in accordance with license and technical specification limits.

No items of noncompliance or deviations were noted.

13. Exit Meetings

Exit meetings were conducted at the end of various segments of this inspection with the Acting Plant Manager.