

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

Report Nos. 50-313/79-21  
50-368/79-20

Docket No. 50-313  
50-368

License No. DPR-51  
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: September 9 - October 5, 1979

Inspector: *T. F. Westerman for* 10-23-79  
W. D. Johnson, Resident Reactor Inspector Date

Approved By: *T. F. Westerman* 10-23-79  
T. F. Westerman, Chief, Reactor Projects Section Date

Inspection Summary

Inspection conducted during period of September 9 - October 5, 1979  
(Report No. 50-313/79-21)

Areas Inspected: Routine, announced inspection of the QA/QC Administrative Program, licensee actions taken in response to IEB 79-04, licensee actions taken in response to IEB 79-14, licensee actions taken in response to IEB 79-05C, and follow-up on open items. The inspection involved 56 inspector-hours on-site by the NRC resident inspector.

Results: Within the five areas inspected, one item of noncompliance was identified. (Deficiency - outdated Q-Lists, paragraph 3)

Inspection conducted during period of September 9 - October 5, 1979  
(Report No. 50-368/79-20).

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Areas Inspected: Routine, announced inspection of the QA/QC Administrative Program, licensee actions taken in response to IEB 79-04, licensee actions taken in response to IEB 79-14, and testing associated with investigating the hot leg temperature anomaly. The inspection involved 33 inspector-hours on-site by the NRC resident inspector.

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

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DETAILS1. Persons Contacteda. AP&L Personnel

J. P. O'Hanlon, ANO General Manager  
 G. H. Miller, Engineering & Technical Support Manager  
 B. A. Baker, Operations Superintendent  
 T. N. Cogburn, Nuclear Engineer  
 E. C. Ewing, Production Startup Supervisor  
 B. A. Terwilliger, Operations and Maintenance Manager  
 M. Stroud, Electrical Maintenance Supervisor  
 J. McWilliams, Assistant Operations Superintendent  
 J. Vandergrift, Training Supervisor  
 T. Green, Training Coordinator  
 D. Trimble, Licensing Manager  
 C. Shively, Plant Performance Engineer  
 R. Lane, Manager, Mechanical Engineering  
 M. Clary, Production Engineer  
 L. Humphry, Manager, QA  
 R. Bata, QA Engineer  
 J. Anderson, Acting QC Supervisor  
 D. Snellings, Technical Analysis Superintendent  
 B. Ideker, Licensing Engineer

b. Bechtel Personnel

R. Redford, Resident Engineer  
 C. Beardsley, Lead Mechanical Engineer  
 R. Jurcik, Assistant Field Engineer  
 R. Cameron, Field Project Engineer

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

2. Inspector Follow-up on Previously Identified Items (Unit 1)

(Closed) Open Item 313/79-09-05 (Inspection Report 79-09): Emergency Feedwater System (EFW)

The licensee has installed and tested flow indicators for the EFW system. Other modifications to the EFW system will be reviewed as a part of the follow-up to IEB 79-05 long-term action items.

(Closed) Open Item 313/79-10-05 (Inspection Report 79-10): P7B discharge line support inoperable.

The licensee has repaired this pipe support.

(Closed) Open Item 313/79-10-03 (Inspection Report 79-10): Yellow and magenta tape on floor around the emergency feedwater pumps.

The tape in question has been removed.

3. QA/QC Administration Program (Unit 1 and 2)

a. Q-List

Section 2.6 of the licensee's Quality Assurance Manual for Operations identifies the Q-List as a design document which specifically identifies those systems, structures and components whose failure could cause of uncontrolled release of radioactivity, or those essential for safe shutdown and the immediate and long-term operation following a Loss of Coolant Accident. The Q-List provides for application of QA Program requirement to specific systems, structures and components.

The AP&L procedure which controls changes to the Q-List is GCP-300 "Nuclear Licensing Document Control." Revision 0 of this procedure was issued on June 8, 1979. The distribution and control aspects of this procedure with respect to the Unit 1 Q-List have not yet been fully implemented. The latest revision to the Unit 1 Q-List is Amendment 15 of February 1979. The inspector examined the Unit 1 Q-Lists held by three AP&L staff members on site. The revisions held are listed below:

- (1) Revision 8 of December 1974
- (2) Revision 11 of February 1978
- (3) Undated version, possible original

Section 4.4.7.2 of GCP 300 requires that each designated person having a copy of the Q-List shall ensure that his Q-List is kept up to date with all amendments. This is an apparent item of noncompliance.  
(313/79-21-01)

b. QA Procedures

AP&L procedure QAA-10 "Control of AP&L QA Manuals" is the established administrative control procedure for QA procedures. It provides for review and approval of procedures prior to implementation;

methods and procedures for procedure revisions; and methods and controls for distribution of procedures.

c. QC Procedures

QCP 1004.21 "Handling of Procedures" and QCP 1004.22 "Document Control" are the established administrative control procedures for QC procedures. QCP 1004.21 provides for review and approval of procedures prior to implementation and methods and procedures for procedure revisions. QCP 1004.22 provides methods and controls for distribution of procedures.

d. Overall Review of QA Program Effectiveness

Section 2.8 of the licensee's Quality Assurance Manual for Operations assigns responsibility to the Manager of Quality Assurance for an annual review of the QA Program to determine the effectiveness and proper implementation of the program. The licensee has been performing this function by means of a QA Manager review of the annual Quality Assurance General Audit (ANO-14). Following discussions during a recent NRC Performance Appraisal Team inspection, the QA Manager is developing additional means of performing this function. This new system; when developed, should enable the licensee to better identify areas which need improvement and to provide increased emphasis in those areas. (Open Item 313/79-21-02; 368/79-20-01)

4. Follow-up on IE Bulletin 79-04 (Units 1 & 2)

IE Bulletin 79-04, entitled "Incorrect Weights for Swing Check Valves Manufactured by Velan Engineering Corporation" was issued on March 30, 1979. The licensee's response to this bulletin was dated April 27, 1979. This response indicated that conservative valve weights were used in the piping analysis for all Seismic Category I piping systems in which 3 or 4 inch Velan swing check valves are installed. The inspector reviewed this response and had no further questions on this matter.

5. Follow-up on IE Bulletin 79-14 (Unit 1)

IEB 79-14 was issued on July 2, 1979, revised on July 18, 1979 and supplemented on August 15, 1979. This bulletin is entitled, "Seismic Stress Analysis for As-Built Safety-Related Piping Systems," and requested that licensees take certain actions to verify that seismic analysis are applicable to as-built plants. During this inspection period the inspector reviewed the licensee's activities with respect to this bulletin.

a. Development of Inspection Elements

The inspector reviewed the organization and the qualifications of the persons who developed the inspection elements to be used in verifying that the seismic analysis input information conforms to the actual configuration of safety-related systems. Work Plan No. 86 was developed by the licensee and its contractor to control the field inspection required by the Bulletin. The inspector reviewed the Work Plan and interviewed several persons who provided input to the development of the Work Plan. The Work Plan appeared to be adequate for its intended function. The licensee's response to item 1 of the Bulletin was dated 8/1/79.

The inspector also reviewed the documentation of the licensee's inspection of the piping and hangers associated with isometric drawing 17-MU-25. The inspection appeared to have been performed in accordance with the requirements of the Work Plan.

b. Inspection of Accessible and Normally Inaccessible Piping

During a previous inspection, the inspector observed in part the licensee's physical inspection of piping systems in both accessible areas and in normally inaccessible areas. The licensee's letter of August 13, 1979 reported the completion of the required inspections and provided a schedule for completion of the detailed review and analysis of the inspection data. The inspector independently inspected the piping and hangers associated with isometric drawing 17-MU-25 and compared his findings to those of the licensee. The inspector found that one hanger (MU-222) had a nut missing. The licensee initiated action to have the nut replaced. The inspector's other observations compared favorably with those of the licensee's inspection team, but the inspector found that not all of the licensee inspection team's findings had been transferred to the fabrication isometric drawing and forwarded to the stress engineers for analysis. The line segment inspected has attachments including one inch sensing lines from two flow elements which were not shown on the fabrication isometric. The configuration of these attachments was promptly forwarded to the contractor's stress engineers for analysis after the inspector pointed out the discrepancy. In order to determine whether this was a common problem or an isolated instance, the licensee's Manager of Engineering and Technical Support agreed to have a representative sample of inspection packages reviewed again. This review would include the following elements:

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- . Whether any pipe supports were described as inaccessible and were not inspected.
- . Comparison of marked up field copy of the isometric with the revised sepia forwarded to the stress engineers.
- . Review of piping and instrumentation drawings to assure that all attachments were noted on the fabrication isometric.

In addition, the final revised drawings are to be returned to the site for review against the marked up field copy of the isometric. This item is considered unresolved pending the inspector's review of the above actions. (313/79-21-03)

c. Nonconformance Evaluations

The licensee's letter of September 14, 1979 provided, for accessible systems, a list of isometrics in which all nonconformances were found to be within established tolerances or were judged to be acceptable by the initial engineering evaluation. This letter also provided a list of isometrics for accessible systems where nonconformances were found to be out of established tolerances but were judged to be acceptable by the initial engineering evaluation. This group of isometrics will require additional analysis, the results of which are to be provided by the licensee by October 12, 1979. Similar submittals for inaccessible piping are to be made by the licensee by November 12, 1979 and December 13, 1979.

d. Correction of Nonconformances

The licensee's letter of August 31, 1979 reported that required corrective action had been taken on all nonconformances judged to affect system operability in the initial engineering evaluations. This submittal included a listing of the required corrective action on such nonconformances.

e. Improvement of quality Assurance

The licensee provided a schedule for updating stress isometrics in his letter of August 31, 1979. This drawing revision effort is scheduled to be complete by November 12, 1979. The licensee issued a new procedure on July 12, 1979 to control the design change process. This procedure, entitled "Design Process Procedure" is procedure number 202 of the Generation and Construction Department Procedures. This procedure contains steps which should assure that future modifications of piping systems and their supports will be reflected in a timely manner in design documents and the seismic analysis. This procedure covers design change activities performed at the general

office, but not those performed by the engineering staff on site. A similar procedure, covering on-site activities was in the review process at the time of this inspection. (Open item 313/79-21-04; 368/79-20-02)

The inspector will complete his review of the licensee's activities in response to IEB 79-14 during a future inspection. No items of noncompliance or deviations were identified.

6. Follow-up on IE Bulletin 79-14 (Unit 2)

The licensee's response to this bulletin for Unit 2 was dated August 1, 1979. This response outlined field control and verification measures which were used for Unit 2 during the construction and startup phases and stated that these measures assure that the as-built configurations of all safety-related piping have valid and up-to-date seismic analysis. Based on the information provided in this letter, the licensee proposed to perform no inspection on additional verification for Unit 2.

The inspector selected one segment of piping and reviewed site records to verify that sufficient documentation was available to demonstrate that the inspection elements of IEB 79-14 had been inspected and documented. The isometric drawing selected was 2CCB-15-2. The following related records were reviewed:

Field As-Built Isometric	2CCB-15-2 Revision 5 (F-17)
As-Built Isometric	2CCB-15-2 Revision 6
Field Inspection Checklists	

- Spool 2CCB-15-2-2
- Spool 2CCB-15-2-1A
- Spool 2CCB-15-2-1
- Flued Heads 2CCB-15-2-2P25
- Hanger 2CCB-15-H9
- Hanger 2CCB-15-H8
- Hanger 2CCB-15-H7
- Hanger 2CCB-15-H6
- Hanger 2CCB-15-H5
- Hanger 2CCB-15-H4

Field Inspection Reports Hanger Drawings

- H5-1509 Revision 2 (F-1)
- H5-1508 Revision 0 (F-1)
- H5-1507 Revision 2
- H5-1506 Revision 3
- H5-1506 Revision 4

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H5-1505 Revision 1  
 H5-1505 Revision 2  
 H5-1504 Revision 2 (F-2)

Pipe Support/Restraint Installation Review Form P129, Drawing M2687  
 Sheet 95 Hanger Design Information Package.

No discrepancies were identified. Based on the records reviewed, it appears that adequate documentation exists to support licensee's verification process.

7. Follow-up on IE Bulletin 79-05C (Unit 1)

IE Bulletin 79-05C was issued on July 26, 1979. This bulletin required that the licensee take certain actions to alleviate the concern over delayed tripping of the reactor coolant pumps after a Loss of Coolant Accident (LOCA).

The licensee's letter of August 29, 1979, provided responses to short-term action items 1 through 4 of the bulletin and provided a schedule for response to short-term action item number 5 and to the long-term action item. The licensee's letter of September 14, 1979, provided additional analysis as requested by the NRC staff.

The inspector had previously verified that licensee's action in response to short-term action item number 1. During this inspection period, the inspector reviewed the licensee's emergency procedures for conformance to the Babcock and Wilcox guidelines for operator actions. The observed differences are summarized below.

a. Immediate Trip of Reactor Coolant Pumps

The B&W guidelines state, "Upon automatic actuation of the ESFAS due to low reactor coolant system pressure, RC pump operation shall be promptly terminated." The guidelines further state that, "If the ESFAS has been initiated on low RC pressure, termination RC pump operation takes precedence over all other immediate actions."

AP&L Emergency Procedure (EP) 1202.06, "Loss of Coolant/RC Pressure," Section 1 "Rupture: Leakage Greater than HPI Capacity," contains an immediate action step to trip all operating RCP's. However, the first immediate action of this procedure is to verify reactor and turbine trip.

EP 1202.06, Section II, "Rupture within HPI Capacity," contains an immediate action step to trip all operating RCP's if E.S. automatic actuation occurs at any time during the transient. However, three

other immediate actions are listed before this one. These steps involve closing the letdown cooler inlet valves, isolating the electromatic relief valve, and tripping the reactor and turbine generator if pressurizer level is not restored or RCS pressure does not recover after letdown and ERV isolation.

b. Steam Generator Level to be Maintained for Natural Circulation

The B&W guidelines recommend that SG level be maintained at 95% on the operating range level indication following RCP trip to ensure establishment of natural circulation.

EP 1202.06 and 1202.14 (Loss of Reactor Coolant Flow - RCP Trip) require that SG levels be raised to between 50% and 95% on the operating range level indication following RCP trip.

c. RCP Operating During Overcooling Transients

The B&W guidelines state that the immediate actions for both overcooling and small break transients are the same, including tripping of the RC pumps. The guidelines use the low pressure EFAS actuation as a criterion for tripping the RCP's and describe this criterion as a clear, simple and early indication that a small LOCA may be in progress. This requires no decision process or monitoring by the operator to determine whether tripping the RCP's is necessary.

The licensee's emergency procedures 1202.06 and 1202.24 (Steam Supply System Rupture Procedure) distinguish between a LOCA and an overcooling event in the symptoms sections of the procedures. Therefore, the operator is not directed to trip the RCP's in response to an EFAS actuation which has been determined to be caused by an overcooling event. In procedure 1202.24 the operator is directed to stop RCP's as necessary to achieve single pump operation in the unaffected loop if EFAS has been actuated.

The inspector discussed these differences with licensee representatives. They believe that their procedures are superior to the B&W guidelines in these areas and allow better control of the plant during transients while meeting the requirements of IE Bulletin 79-05C. The inspector informed the licensee representatives that he would refer the differences to NRC Headquarters for resolution. This is an open item. (313/79-21-05)

8. Hot Leg Temperature Anomaly (Unit 2)

In June 1979, the licensee identified anomalous behavior in the temperature indications from the resistance temperature detectors (RTDs)

in the reactor coolant system (RCS) hot legs. At 50% power the two RTD's on the west side of the two hot legs indicate about  $3\frac{1}{2}$ °F higher than the two RTD's on the east side. This temperature difference appears to be proportional to power level. Occasionally the relationship reverses momentarily such that the east RTD's read higher than the west RTD's. These transients are non-periodic and their duration and frequency of occurrence appear to be random. The reversals in one hot leg appear to be independent of those in the other hot leg.

The licensee and Combustion Engineering have performed extensive testing to evaluate the anomaly. They have reached a conclusion that the temperature differential is due to lateral stratification in the region between the core outlet and RTD locations in the hot legs, and that the flow asymmetries have two meta-stable states in each loop. Random events are believed to trigger a temporary shift to the less stable state.

In order to verify that the condition is not being caused by some abnormal condition in the reactor vessel internals, the licensee is performing an inspection of the internals. The licensee is concurrently performing a design change to minimize the effect of the temperature reversals on the Core Protection Calculators. After the internals inspection and design change installation, the licensee plans to perform extensive restart testing and then to continue normal power ascension.

The inspector has observed portions of the testing performed to date and he attended a presentation given to NRC/NRR on October 4, 1979, by the licensee and his contractor. The inspector will continue to observe portions of the inspection and testing related to this phenoma. No items of noncompliance or deficiencies have been identified.

3). Exit Interviews

Exit interviews were conducted at the end of various segments of this inspection with Mr. J. P. O'Hanlon (Plant General Manager) and other members of the AP&L staff.