

APPENDIX B  
U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 50-313/89-39  
50-368/89-39

Docket Nos. 50-313  
50-368

License Nos. DPR-51  
NPF-6

Licensee: Arkansas Power and Light Company  
Ninth and Louisiana Street  
Little Rock, Arkansas 72203

Facility Name: Arkansas 1

Inspection At: Russellville, Arkansas

Inspection Conducted: October 16-26, 1989

Inspectors:	<u>J. Strosnider</u>	<u>12/29/89</u>
	for Harry W. Kerch, Lead Reactor Engineer	date
	<u>J. Strosnider</u>	<u>12/29/89</u>
	for R. H. Harris, NDE Technician	date
	<u>J. Strosnider</u>	<u>12/29/89</u>
	for M. A. Oliveri, NDE Technician	date
Approved by:	<u>Jack Strosnider</u>	<u>12/29/89</u>
	J. R. Strosnider, Chief, Materials, and Processes Section, EB, DRS, Region I	date

Inspection Summary: A routine, announced inspection was conducted at the Arkansas Nuclear Power Station, Unit 2, using the NRC Mobile Nondestructive Examination (NDE) Laboratory. The inspection focused on activities related to the inservice inspection, erosion - corrosion, and modification and drawing control programs.

Three violations and two unresolved items were identified during this inspection.

#### VIOLATIONS

- 89-39-03 Failure to establish a weld marking program as required by Section XI code requirements. (Section 3.0)
- 89-39-04 Failure to establish an effective drawing control program as required by 10CFR50 Appendix B. (Section 4.0)
- 89-39-05 Failure to establish control and provide appropriate storage for quality records. (Section 5.0)

#### UNRESOLVED ITEMS

- 89-39-01 Review of ISI calibration block configurations against Section XI code requirements. (Section 3.0)
- 89-39-02 Deficiencies in ultrasonic test data. (Section 3.0)

The main area requiring attention is the drawing upgrade and control programs. Significant problems exist with the current drawings and it is not clear that the efforts underway to correct these problems will be effective or timely.

## DETAILS

### 1.0 Persons Contacted (30703)

#### Arkansas Power and Light (AP&L)

Don Lomas, Licensing  
\*Jack Waxenfelter, Manager Maintenance  
Julie Jacks, Safety and Licensing  
\*James J. Fisicaro, Licensing  
\*Jimmy D. Vandergrift, Plant Manager Unit I  
Rocky L. Jones, Pipe Thinning Coordinator  
David Crabtree, Engineering Programs  
Sandy McGregor, Engineering Services  
\*Larry Humphrey, Manager Nuclear Quality  
\*Robert Fenechi, Plant Manager Unit II  
Don R. Payne, Maintenance Coordinator  
Patricia Campbell, Engineer ISI/IST  
\*Ray Reamy, Technical Specialist  
\*Jerry Ray, Welding/NDE  
Rick Lane, Engineer Manager  
\*N. S. Carns, Director Nuclear Operations  
\*Early C. Ewing, Technical Support and Assessment  
\*James L. Taylor-Brown, Supervisor QA/QC/NDE  
Rick J. King, Licensing  
B. A. Sessoms, Operations Manager  
J. R. Donet, Supervisor QA  
Donald B. Lomax, Licensing  
G. D. Proviencher, Superintendent QA  
G. T. Jones, Engineering  
J. J. Mueller, Central Maintenance  
D. C. Mims, Plant Engineering

#### U.S. Nuclear Regulatory Commission

\*Clay Warren, Senior Resident Inspector, RIV  
Les Gilbert, Reactor Inspector, RIV  
\*Phil Wagner, Reactor Inspector, RIV

\*Denotes those attending entrance and exit meeting.

The above listed personnel were present at the exit meeting. The inspector also contacted other administrative and technical personnel during the inspection.



## 2.0 Independent Measurements - NRC Nondestructive Examination and Quality Records Review of Safety Related Systems

During the period of October 16 through October 26, 1989 an onsite independent inspection was conducted at the Arkansas Nuclear One Power Station. The inspection was conducted by NRC regional based inspectors. The objectives of this inspection were to assess the adequacy of the licensee's inservice inspection, welding quality control and pipe modification programs and to assess the acceptability of the "As-Built" configuration of pipe hangers and supports. These objectives were accomplished by reperforming selected examinations required of the licensee by regulations and codes.

### 2.1 Nondestructive Examination (NDE)

#### Visual Examination (57050)

Thirty-nine (39) safety related pipe weldments and adjacent base material ( $\frac{1}{2}$  inch on either side of the weld) were visually examined in accordance with NRC procedure NDE-10, Rev. 0, Appendix A; associated site procedure ASME Section XI Visual Examination VT-1, VT-2, VT-3, and VT-4 1092.023 Rev. 1; QC documents; and isometric and as-built drawings. Examined during this inspection were ASME Class 1, 2 and 3 pipe weldments selected from the safety injection (SI), reactor coolant (RC), chemical volume control (CVC), emergency feedwater (EFW), core spray (CS) and reactor miscellaneous (RMS) systems. This examination was performed specifically to identify any cracks or linear indications, gouges, leakage, arc strikes with craters or corrosion which may infringe upon the minimum pipe wall thickness, and modifications to piping or components. Mirrors, flash lights and weld gauges were used to aid in the inspections.

#### Results

The welding and overall workmanship inspected was satisfactory. No violations were identified. However, visual inspection of 10" pipe weld number 2GCB-16-1, FW1C1 revealed that a support lug which had been welded next to FW1C1 had broken off, removing some of the piping base material. This was brought to the licensee's attention for disposition. The inspector discussed planned corrective actions with the licensee which included removing the remaining portion of the lug, performing a penetrant inspection on the removal area and performing ultrasonic thickness measurements to ensure that adequate pipe wall thickness remains.

Also reinspected by visual examination was the lug removal area adjacent to 2GCB-10-1, FW5C1. This was reinspected because of linear indications seen on a radiograph of FW5C1. These indications proved to be nonrelevant surface scoring made by a hack saw when the lug was removed. Attachments 1 and 3 list the specific welds examined and the examination results.

#### Visual Inspection Hanger/Support (57050)

During this inspection twenty-three (23) safety related piping hanger/supports were visually inspected per NRC procedure NDE-10, Rev. 0, Appendix A and B in conjunction with site procedure ASME Section XI Visual Examination VI-1, VT-2, VT-3 and VT-4 1092.023, Rev. 1; QC documents; and associated isometric drawings. Included in this inspection were hanger/supports selected from the service water (SW) system. In the area of welds, the accessible surface area and adjacent base metal for a distance of one-half inch on either side of the weld was examined. Specific attributes looked for were proper installation, configuration or modification of supports; evidence of mechanical or structural damage; corrosion; and bent, missing or broken members. Attachment No. 2 is a list of specific hanger/supports inspected.

Results: No violations or deficiencies were identified. The welding and overall workmanship of the hanger/supports inspected were satisfactory.

#### Liquid Penetrant Examination (57060)

Twenty-four (24) safety related pipe weldments and adjacent base material ( $\frac{1}{2}$  inch on either side of the weld) were examined using the visible dye, solvent removable liquid penetrant method per NRC procedure NDE-9, Rev. 0, in conjunction with the licensee's procedure 23.b.52, Rev. 1. Included in this inspection were ASME Class 2 stainless steel field and vendor shop weldments selected from the safety injection (SI) system.

#### Results

The surface areas examined were properly prepared for penetrant examination. No violations or deficiencies were identified.

#### Radiographic Examination (57090)

Fifteen (15) safety related pipe weldments were radiographically examined using an Iridium 192 source. The procedure and technique used were in accordance with NRC Procedure NDE-5, Rev. 0; the licensee's procedure entitled Radiographic Examination of Welds, Rev. 5; radiographic data sheets and associated isometric drawings. Included in this sample were ASME Class 1, 2 and 3 pipe weldments selected from the reactor coolant (RC), safety injection (SI), chemical volume control (CVC), core spray (CS), emergency feedwater (EFW) and reactor miscellaneous (RMS) systems. The resulting radiographs were reviewed, compared with the licensee's radiographs and evaluated.

Results: No violations were identified.

### Transducer Evaluation Test (57080)

During this inspection ultrasonic data records for ultrasonic transducers were compared to the original transducer standards and specifications. In addition to the review of the ultrasonic transducer data reports, five ultrasonic search units (transducers) belonging to the site inservice inspection contractor (Combustion Engineering) were evaluated. This evaluation was performed using the Universal Testing Interface Module (UTIM) and Transducer Evaluation Test Software (TET) which are part of the NRC Test-Pro personal computer based ultrasonic testing system. The transducer evaluation test contains a routine which will enable the user to:

1. Acquire transducer waveforms
2. Calculate a set of features from a transducer signal such as frequency, maximum sound, upper and lower 6d.b. frequency, band center frequency, center frequency, band width, and signal rise and fall times.
3. Display the collected signal and measured parameters
4. Generate a test report which identifies the transducer variables, serial number, type, frequency, size and all those parameters needed to evaluate the transducer.

The inspectors were particularly interested in verifying that the transducer band width was still acceptable and that the peak frequency of the transducer had not deviated significantly from the original value as supplied by the manufacturer.

#### Results:

The transducers evaluated were found to have acceptable characteristics. No individual transducer deviated more than 1% from the manufacturer's transducer data.

### Erosion-Corrosion (57080)

Six safety and non-safety related pipe components were examined for erosion/corrosion using a Nortec NDT-124 digital thickness gauge. The method and procedures used were in accordance with NRC procedure NDE-11, Rev. 0 in conjunction with the licensee's erosion-corrosion monitoring program and associated quality control documents. The thickness measurements were taken at predetermined areas located on the systems identified for inspection, with concentration on geometries most susceptible to erosion-corrosion. The areas inspected were laid out in a grid pattern. The grid patterns had from 1 to 3 inch grid spacings depending on the pipe diameter.



Included in this inspection were various size pipe components selected from the main steam, reheat steam, feedwater, high pressure extraction steam, and condensate systems.

### Results

A comparison of thickness readings taken by the NRC and the licensee revealed no significant difference in measurements. While the licensee has a good program to predict and monitor the occurrence of erosion-corrosion, the licensee's procedure does not direct the calculation of erosion-corrosion rates of pipe components. Although not in the procedure, the corrosion rates are calculated when the data is entered into the EPRI CHEK program. Including the calculational step in the procedure would be an improvement.

### 3.0 Inservice Inspection (ISI) Program (73753)

Arkansas Unit 1 inservice inspection program is required to meet the ASME Section XI code, 1980 edition with addenda through winter 1981. The Arkansas Unit 2 inservice inspection program was prepared and implemented by Arkansas Power and Light Company. The ISI Program requirements are in Procedure 1092.25 and incorporate the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1974 edition, through the summer of 1975 addenda. The present outage for Unit 2 completes the first 10 year interval. As of March 26, 1990, Unit 2 will be committed to the 1986 code. Correspondence between the licensee and NRR indicates that by the end of December 1989 the licensee will submit to NRR a new ISI program that meets the ASME Section XI 1986 code (with no addenda) for Unit 2.

#### ISI Calibration Blocks

The inspection revealed that a review of the "as-built" drawings of the ISI calibration blocks against the requirements of the 1980 ASME Code was not performed for Unit 1 when this edition of the code was adopted. The inspector also noted that the Unit 2 ISI calibration blocks need to be reviewed and any appropriate modifications made to assure the 1986 ASME Section XI code requirements are met prior to adopting the 1986 version of the code.

#### Results

Lack of review of the "as-built" drawing of the ISI calibration blocks against the code requirements currently in effect is considered unresolved pending licensee action and NRC review. (50-313/89-39-01)

#### ISI Vessel Examination (73753)

The reactor vessel was ultrasonically examined during this outage by Combustion Engineering, the ISI contractor. The inspector witnessed the examination process including calibration of the ultrasonic inspection tool and reviewed the qualification of 13 ISI personnel. Ultrasonic data were undergoing review for acceptance at the time of this inspection and were not included in the scope of the inspection.

During the April 1988 reactor vessel inspection at Arkansas Unit 2, the Combustion Engineering ISI inspection tool fell into the reactor vessel. No damage to the reactor or its internals occurred. The inspector reviewed this event to understand why the inspection tool fell and what corrective action was taken to prevent recurrence. The inspector reviewed a Combustion Engineering letter (no date) to Robert A. Michalski, the licensee's principle engineer for the inspection and talked to Combustion Engineering personnel at the site about this problem. It appears that in 1988 the hoist drive pin worked its way out and allowed the entire assembly to fall. Two modifications were identified by Combustion Engineering to prevent recurrence. One added a steel clamp around each drum directly over the pin and the second added an aluminum collar that prevents the drums from moving out of engagement. These modifications had been completed and appear to resolve the problem.

Results: No violations or deficiencies were identified.

#### ISI Manual Ultrasonic Data Review

The following concerns were disclosed during the review of ISI ultrasonic data.

- No profiles of welds were generated or used.
- No code coverage plots were generated to establish that the required code volume of the weld was examined.
- Documentation suggests that ultrasonic reflectors greater than 50% of DAC are possibly not being recorded as required by code.

Although these attributes are not required by the current ISI program, the second ten year program will mandate collection of this information.

#### Results

It was not apparent that the licensee had considered this for the second ten year interval; therefore, this is considered unresolved pending licensee action and NRC review. (50-368/89-39-02)

#### ISI Program Review

During the inspection of the ISI program, it was disclosed that Arkansas Unit 1 has no provision for reference stamping of welds as required by ASME Section XI, IWA-2600 and Appendix III Supplement 2 under the 1980 edition through winter of 1981 for the second 10 year interval. The licensee immediately wrote a condition report No. 1-89-524 that required the establishment of a new ISI procedure that would meet ASME Section XI IWA-2641 by establishing a weld reference stamping system for both Arkansas Units 1 and 2.



## Result

Failure to establish a weld reference system is in violation of Title 10, Paragraph 50.55a. (50-313/89-39-03)

### 4.0 Review of Drawings

During the inspection a sample of approximately 35 drawings associated with welds both in and outside of the ISI program were reviewed. Problems were found with all 35 drawings. Discussed below are the identified drawing problems.

- (i) The latest revisions to many plant isometric drawings do not accurately reflect system modifications and vendor spool drawings.
  - Major modifications to systems have been performed since construction and have significantly affected system configurations. As a result, vendor pipe spool drawings are not accurately reflected in current "as-built" ISO drawings and traceability is lost. Extensive research is needed such as comparing heat numbers of the materials on either side of welds and review of ISO revisions in order to relate vendor spool drawings to the ISO drawings and to determine if they accurately reflect "as-built" conditions.

A specific example of the types of problems encountered is drawing 2CCB-70-4 Rev. 6 Spool S1-2CCB-70-4-2 which had modifications after construction that eliminated two elbows and three vendor welds and added two field welds. No change was made to spool drawing S1-2CCB-70-4-2 to reflect these changes. This situation leads to confusion in trying to implement the ISI program.

These findings represent significant deficiencies in the licensee's control of drawing information and the ability to retrieve historical records.

- The NRC requested approximately 35 drawings during this inspection. Numerous drawings from the Drawing Control Center that were indicated as the latest revisions did not include any revisions that should have been made as a result of Design Change Packages (DCP) nor any copies of the DCPs that affected the reference drawing. For example, when the NRC was provided drawing 26CB-5-1 Rev. 10, problems were encountered with the identification of field weldment FW55C1. Another revision, number 15, was provided for use. This revision cleared up the problem in that it accurately depicted the "as-built" piping. However, drawing 26CB-5-1 Rev. 15 references drawing 2HCB-179-1 Rev. 0 which identifies weld FW55C1 as weld FW1. The above examples of inaccuracy and inconsistency of the information being

provided on drawings were not isolated cases. On another drawing, 2CCB-61-1 Revision 6, several field welds were indicated as requiring radiographic inspection. However, upon inspection in the plant, the inspectors discovered that these welds no longer exist. No change was made to this drawing nor was a copy of the DCP provided with the drawing that explained that the pipe was fabricated with formed bends thus eliminating several welds (DCP 89E-20260).

(ii) Information provided on inservice inspection and vendor drawings is not adequate to effectively implement the ISI program.

- No cross reference is provided between the inservice inspection (ISI) program sketches and vendor weld identifications. This is needed in order to review radiographs, inspection reports and other historical records associated with the weldment.
- Shop welds and field welds are not uniquely identified on drawings.
- As-built drawings for shop welded spool pieces were not indexed nor properly filed.
- Project personnel for the ISO drawing update program indicated that the shop weld unique identifiers are not being included on the new drawings.

(iii) Piping hanger and support drawings do not include changes resulting from design change packages.

Problems were identified during this inspection with the drawings provided for hangers and supports. For example, drawing 2HCC-290-H32 revision N-2 does not reflect the actual "as-built" condition. This drawing supersedes HGR2HBC-40-H32 that did reflect the as-built condition. It appears that the present system of listing only as-builts of the current DCP on hanger and support drawings and eliminating all previous as-built information on other areas not affected by the DCP results in a lot of outdated drawings. The inspector was informed during this inspection that the new Isometric Drawing Update Project will correct all the drawing problems at the Arkansas facilities and that it will take 6 to 8 years to complete. However, based on the inspector's observations, unless significant changes are made now in the area of Quality Assurance and the philosophy of maintaining drawing accuracy there will continue to be serious drawing problems at the facility.

#### Result

The three problem areas discussed above represent failure to establish an effective drawing control system. This is in violation of 10 CFR 50 Appendix B Criterion VI. (50-368,89-39-04)

## 5.0 Control of Quality Assurance Records

This inspection disclosed that over seventeen 5 drawer file cabinets containing quality assurance records such as vendor spool weld identifications, as-built drawings, and inspection reports were stored in the hall of the drawing control center. These records were not indexed, filed nor maintained in facilities that provided a suitable environment to minimize deterioration and damage or to prevent loss.

### Results

Failure to establish control and provide appropriate storage of quality assurance records, is a violation of 10 CFR 50, Appendix B, Criterion XVII. (50-368/89-39-05)

## 6.0 Follow-up Items

### (Closed) Violation 50-368/88-03-01, Illegible Drawings

The inspector reviewed the corrective action taken by the licensee to prevent illegible drawings from being issued. The inspector performed a walkdown at the fabrication shop and reviewed approximately 30 drawings being used, all were found to be legible.

This violation is closed.

### (Closed) Violation 50-368/88-03-02, Control of Material Which Does Not Conform

The inspector reviewed the corrective actions taken by the licensee. These included issuing standing order 1000.26A and Revision 24 of the plant modification procedure for control of prefabricated parts and subassemblies, 6030.04 Rev. 0. The documents classified the requirements to control nonconforming material. The inspector performed a walkdown in the laydown area and fabrication shop. No improperly controlled items were identified. This violation is considered closed.

## 7.0 Review of Site NDE Procedures and Manuals

The procedures listed in Attachment V were reviewed in the regional office during this inspection period for compliance with the licensee's FSAR commitments and applicable codes, standards and specifications.

## 8.0 Attachments

Attachment No. 1 is a tabulation of specific pipe weldments and components examined and the results. Attachment No. 2 is a tabulation of hanger/support components examined and results. Attachment No. 3 is a tabulation of specific plant modifications examined and the results. Attachment No. 4 is a tabulation of specific areas examined selected from the site erosion/corrosion plan and the inspection results. Attachment V is a listing of procedures that were reviewed.



#### 9.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or violations. Unresolved items are contained in Section 4.0 of this inspection report.

#### 10.0 Management Meetings

Licensee management was informed of the scope and purpose of the inspection at the entrance interview on September 28, 1989. The findings of the inspection were discussed with licensee representatives during the course of the inspection and presented to licensee management at the exit interview (see paragraph 1.0 for attendees). At no time during the inspection was written material provided to the licensee by the inspector. The licensee did not indicate that proprietary information was involved within the scope of this inspection.

ISI/DWG	WELD ID	SYS	CL	RT	MT	PT	VT	ACC	REJ	COMMENTS
2CCB-4-1	FW-1	SI	2			X	X	X		ISI 61-026
2CCB-4-1	VW-A	SI	2			X	X	X		ISI 61-027 (2R1)
2CCB-4-1	VW-B	SI	2			X	X	X		ISI 61-028 (2R1)
2CCB-4-1	VW-C	SI	2			X	X	X		ISI 61-029 (2R1)
2CCB-4-1	VW-D	SI	2			X	..	X		ISI 61-030 (2R1)
2GCB-7-1	VW-B	SI	2			X	X	X		ISI 61-024
2GCB-7-1	FW-1	SI	2			X	X	X		ISI 61-024
2CCB-70-4	FW-20	SI	2			X	X	X		
2CCB-70-4	FW-21	SI	2			X	X	X		
2CCB-70-4	FW-22	SI	2			X	X	X		
2CCB-70-4	FW-25	SI	2			X	X	X		
2CCB-12-1	FW-73	SI	2			X	X	X		
2CCB-12-1	FW-74	SI	2			X	X	X		
2CCB-12-1	FW-6B	SI	2			X	X	X		
2CCB-12-1	VW-D	SI	2			X	X	X		
2CCB-12-1	VW-E	SI	2			X	X	X		
2CCB-12-1	VW-F	SI	2			X	X	X		
2CCB-12-1	VW-G	SI	2			X	X	X		
2CCB-12-1	VW-H	SI	2			X	X	X		
2HCB-5-1	FW-54C1	SI	2			X	X	X		
2HCB-179-1	FW-1	SI	2			X	X	X		
2HCB-179-1	FW-2	SI	2			X	X	X		
2HCB-179-1	FW-55C1	SI	2			X	X	X		
2HCB-179-1	FW-56	SI	2			X	X	X		
TOTAL						24	24	24		









ATTACHMENT V

Arkansas Power and Light Company (AP&L) Inspection and Examination  
Procedures

<u>Procedure Title</u>	<u>Number/Revision</u>
ASME Section XI Visual Examination VT-1, VT-2, VT-3 and VT-4	1092.023, Rev. 1
Liquid Penetrant Examination of Welds	23.B.02, Rev. 0
Magnetic Particle Examination Dry Method	21.A.67, Rev. 2
Ultrasonic Examination of Full Penetration Welds	22.A.64, Rev. 2
Ultrasonic Examination of Similar and Dissimilar Metal Welds	22.A.59, Rev. 2
Ultrasonic Material Thickness Measurements (Meter or Digital Readout)	22.A.7-1, Rev. 2
Radiographic Examination of Welds	20.A.69, Rev. 5
Control of Design Change Documents	6020.02, Rev. 3
Design Document Control	6000.20, Rev. 5
Plant Modifications Central File	4011.005, Rev. 3
Design Document Control	1032.011, Rev. 10

Results: No violations were identified.