

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/83-04(DE)

Docket No. 50-331

License No. DFR-49

Licensee: Iowa Electric Light and Power Company  
Security Building, P.O. Box 357  
Cedar Rapids, Iowa 52406

Facility Name: Duane Arnold Energy Center

Inspection At: Duane Arnold Energy Center Site, Palo, Iowa

Inspection Conducted: February 16-19 and March 16-18, 1983

*W. J. Key*  
Inspector: W. J. Key

4/15/83  
Date

*D. H. Danielson*  
Approved By: D. H. Danielson, Chief  
Materials and Processes Section

4/18/83  
Date

Inspection Summary

Inspection on February 16-19 and March 16-18, 1983 (Report No. 50-331/83-04(DE))

Areas Inspected: Review of inservice inspection program and procedures, observation of inspection activities, and review of inspection documentation; followup on recirculation system and attached piping as required by IE Bulletin No. 82-03. The inspection involved a total of 51 inspector-hours by one NRC inspector.

Results: No items of noncompliance or deviations were identified.

## DETAILS

### Persons Contacted

#### Iowa Electric Light and Power Company (IE)

- \*L. Root, Vice President, Nuclear
- \*D. Mineck, Plant Manager
  - K. Harrington, Staff Engineer
- \*G. Hudson, ISI Coordinator
  - B. McCracken, QC Supervisor
  - H. Runyann, Mechanical Engineer

\*Denotes those present at either the entrance or exit meeting.

### Licensee Action on Previous Inspection Findings

(CLOSED) Open Item (331/78-10-01): The Lambert MacGill and Thomas (LMT) Quality Assurance Manual was unclear on commitments to the 18 criteria of 10 CFR 50, Appendix B.

The inspector reviewed the LMT QA manual and has determined that it is responsive to those portions of the 18 Criteria of 10 CFR 50, Appendix B, applicable to the corporation.

(CLOSED) Open Item (331/78-10-02): The LMT QA Program is unclear as to disposition of final NDE examination results.

The LMT QA Manual Procedure No. QA-4, Revision 6, Section V, states, "Examination documentation generated in the field shall be handled according to rules contained in the Process Procedure governing generation of the material. Where no specific Process Procedure is applicable, the following rules shall apply:

- A. Field Storage facilities shall provide a safe storage area, and access to files shall be limited to the LMT Field Supervisor and his designated representatives.
- B. Original documentation shall become the property and responsibility of the client upon his sign-off.

Process Procedure No. UT-11, Revision 3, Section XV, states:

- A. Examination documentation shall become the property of the client upon his sign-off. Additional reports, which may include examination documentation as reference material, shall be generated from copies.
- B. Field storage facilities shall provide a safe storage area and access to files shall be limited to the LMT Field Supervisor and his designated representatives. The inspector has no further questions.

(CLOSED) Noncompliance (331/78-33-01): It was impossible to determine, from documentation if welders had qualified on a shop mock-up as required by ASME Code and DCR-800-B for restricted access welding.

During repair of the recirculation nozzles confusion did exist between the various welding engineers as to what was required by GE Specification DCR-800-B, for welder qualification on the mock-up. Documentation of welder qualifications was not being maintained as required.

Following an NRC Enforcement Meeting welder qualifications were documented on a computer file showing which welders were qualified and to what welding procedures. The inspector has no further questions.

(CLOSED) Noncompliance (331/78-33-02): Tools used in repair welding were not properly controlled, carbon steel tools were being used on stainless steel and Inconel welds. NRC inspectors did not observe carbon steel tools being used on welds, however, they were observed in the vicinity of welds. The licensee developed a procedure for control of tools being used on stainless steel and Inconel. All tools checked out of the tool room for use on stainless steel or Inconel were color coded. The inspector has no further questions.

(CLOSED) Noncompliance (331/78-33-03): Portable weld rod ovens were being issued to welders that had not been calibrated, and were not in the calibration program.

All portable weld rod ovens were calibrated before being placed in the calibration program and all rod room attendants were given instructions for issuing rod and portable ovens. Instructions were posted in issue room. The inspector has no further questions.

(CLOSED) Noncompliance (331/78-33-04): Partially consumed weld rod stubs littered the work area and were generally uncontrolled. All welders were instructed and issued stub buckets. When a welder withdrew weld rod all stubs or unused rod had to be returned to the issue room. The inspector has no further questions.

(CLOSED) Unresolved Item (331/78-33-05): Weld rod stub inadvertently trapped in the recirculation system at inlet nozzle B. The weld rod was ground out and the weld repaired by rewelding then radiographically examined.

(CLOSED) Unresolved Item (331/78-33-06): The licensee is to provide analytical data to show that weld quality has not been compromised by the use of uncontrolled carbon steel tools and inadequate tool control procedure.

The licensee developed an adequate tool control procedure and instructions to welders and QC engineers and all weld documentation was reviewed by NRC Region III staff. The licensee further had consultants evaluate all radiographs and ultrasonic examination reports of all recirculation system repair welds. The inspector has no further questions.

(CLOSED) Unresolved Item (331/78-33-07): Lead wool dust from lead wool used between the lead brick shielding was in contact with alloy steel piping.

The licensee submitted documentation from GE and other consultants showing that 10% nitric acid can completely remove lead contamination from stainless steel and Alloy 600 substrates in less than one hour at room temperature, and that the small amounts of lead corrosion products involved should be dissolved and removed by the reactor cleanup system during system flushing prior to unit start up. The inspector has no further questions.

(CLOSED) Unresolved Item (331/78-33-05): Weld documentation is being "Voided" and not maintained as part of the weld joint history record.

NRC Region III staff halted all repair welding until a 100% review of weld documentation could be performed by the licensee and procedures developed and implemented and QC inspectors retrained in their use. Following their review the Region III staff reviewed the licensee's corrective actions and permitted resumption of repair welding.

#### Licensee Actions on IE Bulletins

(CLOSED) IE Bulletin No. 82-03 (331/82-03-BB; 331/82-03-1B): IE Bulletin No. 82-03, Revision 1, addressing "Stress Corrosion Cracking in Large Diameter Stainless Steel Recirculation System Piping at BWR Plants" required licensees of operating BWR plants to examine welds in the recirculation system piping and to demonstrate the effectiveness of the detection capability of their UT methodology and personnel prior to resuming power operations following a scheduled or extended outage.

During this refueling outage the licensee developed an examination program in accordance with Bulletin requirements along with their scheduled ISI program.

The examination agency performing ultrasonic examination at DAEC had performed examinations at the Monticello Nuclear Power Plant, and had demonstrated their qualifications to the NRC staff at Battelle Laboratory, Columbus, Ohio. The inspector examined and compared the DAEC ultrasonic procedure with the procedure used at Monticello and determined that it was satisfactory for these examinations, and waved requalification of the procedure and personnel at Battelle for the DAEC.

(CLOSED) IE Bulletin 78-12 (331/78-12-BB; 331/78-12-1B): This bulletin addressed a typical weld material in reactor pressure vessel welds.

In a memorandum dated July 10, 1980 from G. W. Reinmuth, Assistant Director, Division of Reactor Construction Inspection, IE to G. Fiorelli, Chief, RC & ES Branch, Region III this bulletin was closed based on a review of information submitted by Chicago Bridge and Iron Company stating that all weld material used in subject vessel met the applicable acceptance criteria.

#### Functional or Program Areas Examined

##### 1. Inservice Inspection Program (ISI)

The inspector reviewed the ISI Program for this refueling outage. Items and components from the system listed below were included for ISI. The requirements of ASME Code, Section XI, Table IWB 2600 IWC and IWD for Class 1, 2, and 3 systems are applicable.

- . Recirculation System
- . Main Steam
- . Core Spray
- . RHR Head Spray
- . Head Vent
- . Vessel Instrumentation
- . RCIC

No items of noncompliance or deviations were identified.

2. Inservice Examination Procedures

The inspector reviewed the following ISI Procedures for changes and addenda.

- . UT-2, Revision 6, "Ultrasonic Examination of Ferritic Butt Welds and adjacent Base Metal in The 2.5" and Greater Thickness Range."
- . UT-3, Revision 4, "Ultrasonic Examination of Reactor Vessel Nozzle Forging Inner Radii."
- . UT-4, Revision 4, "Nuclear ISI and PSI Axial Longitudinal Wave Examination of Bolts, Nuts and Forged Parts."
- . UT-25, Revision 0, "Ultrasonic Examination of Nuclear Coolant System Piping, Fittings, and Forgings for The DAEC."

No items of noncompliance or deviations were identified.

3. Personnel Certification/Qualifications

The inspector reviewed the qualification/certification records for the following LMT examination personnel for conformance to NRC and ASME Code requirements:

	<u>MT</u>	<u>UT</u>	<u>PT</u>	<u>VT</u>
R. G. Auer	II	II	II	I
R. D. Burlingame		II		II
F. E. Dohmen		II		II
D. J. Edgel		II		II
K. L. Hall	Trainee			
P. N. Nash		II		
E. L. Thomas	III	III	III	III

No items of noncompliance or deviations were identified.

4. Equipment and Materials

The inspector examined the following LMT equipment and materials for certification and calibration as required by NRC and ASME Code Section XI.

Ultrasonic Instruments, Nortec 131D, S/N-128, 129, 273, 291, 371, 409.

Recorders: Astro-Med Dash, S/N-0A244, IA335

Gulton TR-722J, S/N-2091001, 8082501

Surface Thermometers, S/N-495, 494, 498

Transducers

<u>Transducers</u>	<u>Frequency</u>	<u>Size</u>	<u>Serial No.</u>
Harisonic	5 MHZ	1/4"x1/4"	W2124
Harisonic	5 MHZ	.250"	W2123
Harisonic	2.25	1" x 1"	V1075
Harisonic	2.25	1" x 1"	V10704
Harisonic	2.25	1/4"x1/4"	V12038
Aerotech	2.25	.25"	B04731
Aerotech	2.25	.5"	B10617
Aerotech	5 MHZ	.5"	F05134
Aerotech	1.5 MHZ	.5"	H10143
Aerotech	2.25MHZ	.25"	F13105
Panametrics	2.25	1"	7585

Penetrant Materials

Cleaner - SKC-NF/ZC-7B	82L018
Cleaner - SKC-NF/ZC-7B	82K002
Cleaner - SKC-NF/ZC-7B	82H001
Cleaner - SKC-NF/ZC-7B	82J008
Penetrant - SKL-HF/S	82F059
Developer - SKD-NF/ZP-9B	82J022
Developer - SKD-NF/ZP-9B	82H010

Ultrasonic Calibration Blocks

The inspector examined the calibration blocks listed below. These blocks were made from pipe segments representing piping material installed at the DAEC.

Class I-SS

<u>Size</u>	<u>Schedule</u>	<u>Heat No.</u>	<u>Material</u>
2"	80	308028	A312-304
3"	80	M6445	A312-71-304
4"	80	80359	A312-304
8"	80	80407	304
10"	80	651345	304
16"	80	132002	A182-G.F-304
18"	80	A3533	304

Class I-CS

<u>Size</u>	<u>Schedule</u>	<u>Heat No.</u>	<u>Material</u>
10"	80	62163	A106Gr. B
12"	80	DXR8155	A106Gr. B
16"	80	49069	A106Gr. B
18"	80	89C753	A106Gr. 67

Class II-CS

<u>Size</u>	<u>Schedule</u>	<u>Heat No.</u>	<u>Material</u>
10"	40	N8024	A 106-B
12"	40	N8025	A 106-B
16"	40	N8026	A 106-B

No items of noncompliance or deviations were identified.

5. Observation of Examination

The inspector witnessed in process NDE examination of five recirculation system welds and instrument calibrations being performed to satisfy the requirements of ASME Code ISI program and the requirements of IE Bulletin No. 82-03, Revision 1.

6. Recirculation System Documentation Review

To satisfy the requirements of IEB, 82-03, Revision 1, the licensee performed volumetric examination of recirculation system welds as identified below.

Recirculation Pump "A" and Discharge Valve By-Pass. Isometric Drawing No. 19.

<u>Weld No.</u>	<u>Examination Report No.</u>	<u>Calibrations Block</u>	<u>Material/ Size</u>	<u>Remarks</u>
RCA-BY-18	83-080	28730	SS-22"	
RCA-BJ-30	83-081	28730	SS-22"	
RCA-BK-30	83-082	28730	SS-22"	
RCA-BJ-32	83-083	28730	SS-22"	
RCA-BJ-32	83-084	28730	SS-22"	Long Seam
RCA-BJ-41	83-088	28730	SS-22"	
RCA-BK-42	83-149	28730	SS-22"	
RCA-BJ-41	83-097	28730	SS-22"	Long Seam 1
RCA-BJ-43	83-085	28730	SS-22"	
RCA-BJ-43	83-086	28730	SS-22"	Long Seam 1&2
RCA-BJ-38	83-096	28730	SS-22"	
RBA-BJ-1	83-048	80359	SS-4"	
RBA-BJ-6	83-049	80359	SS-4"	
RBA-BJ-8	83-050	80359	SS-4"	
RBA-BJ-12	83-051	80359	SS-4"	

Recirculation Manifold "A" and Risers E, F, G, H, RMA, RRE, RRG, RRH, RRF, Isometric Drawing No. 20.

<u>Weld No.</u>	<u>Examination Report No.</u>	<u>Calibrations Block</u>	<u>Material/ Size</u>	<u>Remarks</u>
RRG-BF-2	83-028	NX9724	CS/Inc.	NOZ/SE
RRG-BF-2A	83-009	651345	Inc/CS	SE/P
RRG-BJ-3	83-010	651345	SS 10"	
RRG-BJ-4A	83-M7	651345	SS 10"	
RRG-BJ-4	83-018	651345	SS 10"	
RRH-BF-2	83-027	NX9724	CS/Inc.	NOZ/SE
RRH-BF-2A	83-022	NX9724	Inc/CS	SE/P
RRH-BJ-3	83-023	651345	SS 10"	
RRH-BJ-4A	83-024	651345	SS 10"	
RRH-BJ-4	83-025	652345	SS 10"	
RMA-BJ-5	83-033A/ 83-033	132002	SS 16"	Long Seam Manifold/P
RMA-BJ-6	83-087	28730	SS 22"	
RMA-BJ-7	83-034/ 83-034A	132002	SS 16"	Long Seam
RMA-BJ-1	83-035	132002	SS 16"	
RRG-BJ-5	83-019	651345	SS 10"	
RRH-BJ-5	83-026	651345	SS 10"	

Recirculation Pump "B" and Discharge Valve By-Pass, RCB-RBB. Isometric Drawing No. 21

<u>Weld No.</u>	<u>Examination Report No.</u>	<u>Calibrations Block</u>	<u>Material/ Size</u>	<u>Remarks</u>
RCB-BJ-6	83-077	28730	SS 20"	Long Seam 1&2
RCB-BJ-7	83-078	28730	SS 20"	T/P
RCB-BJ-7	83-079	28730	SS 20"	Long Seam
RCB-BJ-24	83-073	28730	SS 20"	P/E
RCB-BJ-24	83-074	28730	SS 20"	IA/OA
RCB-BJ-25	83-075	28730	SS	E/P
RCB-BJ-33	83-076	28730	SS	V/E
RCB-BJ-33	83-099	28730	SS	IA/OA
RBB-BJ-1	83-052	80359	SS	4"
RBB-BJ-6	83-053	80359	SS	4"
RBB-BJ-8	83-054	80359	SS	4"
RBB-BJ-12	83-055	80359	SS	4"

Recirculation Manifold "B" and Risers A, B, C, D, RMB, RRA, RRB, RRC, RRd. Isometric Drawing No. 22

<u>Weld No.</u>	<u>Examination Report No.</u>	<u>Calibrations Block</u>	<u>Material/ Size</u>	<u>Remarks</u>
RRC-BF-2	83-029	NX9724	CS/Inc.	NOZ/SE
RRC-BF-2A	83-005 83-005A	651345	Inc/CS	SE/P

<u>Weld No.</u>	<u>Examination Report No.</u>	<u>Calibrations Block</u>	<u>Material/ Size</u>	<u>Remarks</u>
RRC-BJ-3	83-004	651345	SS-10"	
RRC-BJ-4A	83-003	651345	SS-10"	
RRC-BJ-4	83-002	651345	SS-10"	
RRD-BF-2	83-030	NX1924		NOZ/SF
RRD-BF-2A	83-006	651345	Inc/SS	SE/P
RRD-BJ-3	83-007	651345	SS-10"	
RRD-BJ-4A	83-008	651345	SS-10"	
RRD-BJ-4	83-015	651345	SS-10"	
RMB-BJ-6	83-036	132002	SS-16"	P/Manifold
RMB-BJ-7	83-098	28730	SS-22"	Manifold/C
RMB-BJ-8	83-037	132002	SS-16"	
RMB-BJ-1	83-038	132002	SS-16"	C/P
RRC-BJ-5	83-001-A	651345	SS-10"	EL/P
RRD-BJ-5	83-016	651345	SS-10"	EL/P

7. Documentation Review

The inspector reviewed the documentation listed below for recirculation system piping weld examinations and inservice examinations of welds in other systems and components.

- . UT Report No. 83-001, Calibration Report No. PNN-001, Pipe to Elbow 10", S/N RRC-BJ-5, Calibration Block No. 651345
- . UT Report No. 83-002, Calibration Report No. PNN-001, Pipe to Elbow 10", S/N-RRC-BJ-4, Calibration Block No. 651345
- . UT Report No. 83-005, Calibration Report No. PNN-001, Safe-end to Pipe 10", S/N-RRC-BF-2A, Calibration Block No. 651345
- . UT Report No. 83-009, Calibration Report No. PNN-002, Safe-end to Pipe 10", S/N-RRG-BF-2A, Calibration Block No. 651345
- . UT Report No. 83-016, Calibration Report No. PNN-003, Elbow to Pipe 10," S/N RRD-BJ-5, Calibration Block No. 651345
- . UT Report No. 83-027, Calibration Report No. PNN-004, Nozzle to Safe-end, S/N-RRH-BF-2, Calibration Block No. 9724
- . UT Report No 83-033, Calibration Report No. PNN-005, Pipe to Crossover, S/N-RMA-BJ-5, Calibration Block No. 132002
- . UT Report No. 83-045, Calibration Report No. RDB-001, KVH 20" Recirculation, S/N-RHC-BJ-1, Calibration Block No. 28730
- . UT Report No. 83-053, Calibration Report No. PNN-008, Pipe to Tee By-Pass 4", S/N-RBB-BJ-6, Calibration Block No. 80359
- . UT Report No. 83-056, Calibration Report No. PNN-009, Sweeplet to Pipe 6", S/N-MSB-BJ-19, Calibration Block No. L40321

- . UT Report No. 83-118, Calibration Report No. PNN-007, Nozzle to Shell Weld 8", CS Clad S/N-CSA-BD-1, Calibration Block No. B-0402
- . UT Report No 83-137, Calibration Report No. RDB-002, Reactor Vessel Seam, S/N-VCB-BC- , Calibration Block No. B-0402

Exit Interview

The inspector met with licensee representatives (denoted in Persons Contacted, Paragraph) at the conclusion of the inspection. The scope and findings of the inspection were discussed.