

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/82-11(DETP)

Docket No. 50-331

License No. DPR-49

Licensee: Iowa Electric Light and Power Company  
Security Building, Post Office Box 357  
Cedar Rapids, IA 52406

Facility Name: Duane Arnold Energy Center

Inspection At: Palo, IA

Inspection Conducted: July 19-22, 1982

Inspector: *F. C. Hawkins for*  
K. A. Connaughton

9/23/82

Approved By: *F. C. Hawkins*  
F. C. Hawkins, Chief  
Management Programs Section

9/23/82

Inspection Summary

Inspection on July 19-22, 1982 (Report No. 50-331/82-11(DETP))

Areas Inspected: Followup of licensee actions on previous inspection findings: Noncompliance 50-331/81-11-01, Noncompliance 50-331/81-11-03, Unresolved Item 50-331/81-11-02. This inspection consisted of 32 inspector-hours onsite and 20 inspector-hours in office by one NRC inspector.

Results: Of the areas inspected, three items of noncompliance were identified with Unresolved Item 50-331/81-11-02 being upgraded to a noncompliance: failure to establish reference speeds for inservice testing of RCIC and HPCI pumps; inservice test procedures for pumps did not require establishing either reference differential pressure or flowrate prior to taking test data - Paragraph 2b; inadequate inservice test instrumentation - Paragraph 2b; inadequate preoperational testing of a modification to the RHR Service Water System performed under Design Change Request 760 - Paragraph 2c.

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## DETAILS

### 1. Persons Contacted

#### a. Iowa Electric Light and Power Company

- +\*D. Mineck, Plant Superintendent
- B. York
- G. Von Middlesworth, Reactor and Plant Performance Engineer
- +N. Brown, Plant Performance Engineer
- \*A. Howard, Surveillance Coordinator
- B. Lacy, Licensing Engineer
- T. Salata, Electrical Engineer
- +R. McGaughy, Director of Nuclear Generation
- +J. Jinqvist, Assistant Plant Superintendent - Technical Support

#### b. NUTECH Corporation

- +J. Clauss, Project Manager
- +J. Martin, Executive Director

#### c. Nuclear Regulatory Commission

- +J. Peschel, Reactor Inspector, Management Programs Section
- +F. Hawkins, Chief, Management Programs Section
- +L. Clardy, Resident Inspector, DAEC
- +R. Walker, Chief, Projects Section 2c
- +W. Little, Chief, Engineering Inspection Branch

\*Denotes those attending exit meeting on July 22, 1982.

+Denotes those attending technical meeting on September 3, 1982.

### 2. Followup of Licensee Actions on Previous Inspection Findings

- a. (Closed) Noncompliance (50-331/81-11-01): Violation of Technical Specification 3.5.J "Limiting Conditions for Operation - River Water Supply System." The inspector reviewed surveillance test Procedure 45J002 "River Water Supply System Operability Test," Revision 10, to verify that the licensee had incorporated a calculation of River Water Pump TDH and provided the Technical Specification Minimum Operability Limit of 47 feet at flows of greater than or equal to 6000 gpm as acceptance criterion. The inspector also reviewed test results for tests performed from May 1981, until the time of this inspection. This test procedure is also used to satisfy inservice testing requirements for river water supply system pumps and valves and is included in the discussion in Paragraph 2.b below.
- b. (Closed) Noncompliance (50-331/81-11-03): Failure to comply with the requirements of 10 CFR 50.55a(g) for inservice testing of pumps and valves. At the time Noncompliance 50-331/81-11-03 was identified, Revision 3 of the licensee's inservice test program incorporated the requirements of the ASME Code,

Section XI, 1974 edition and addenda through Summer of 1975 subject to relief from certain requirements. Revision 3 of the program, dated November 1, 1980, had been reviewed and approved by the NRC for implementation by the licensee as an acceptable means of satisfying the requirements of 10 CFR 50.55a(g). Noncompliance 81-11-03 identified specific program requirements not being implemented at the time of the inspection. The licensee's response to this item of noncompliance included a commitment to write test procedures which met the applicable requirements and have each procedure test run at least once by March 31, 1982.

The licensee revised the inservice test program to incorporate the requirements of the ASME Code, Section XI, 1980 edition and addenda through Winter of 1980. Implementing procedures were written and each test had been run at least once prior to March 31, 1982, with the exception of certain valve tests which were required to be performed during refueling outages.

The licensee had not submitted the revised program for NRC review. Discussions with licensee personnel and a cursory review of the program by the inspector indicated that the reviewed program did not contain any new exemptions from ASME Code requirements.

This is an unresolved item pending NRC review of the revised inservice test program (50-331/82-11-01).

The inspector reviewed the licensee's current inservice test program for pumps and valves, implementing procedures, inservice test results, inservice test instrumentation, and required records to determine whether or not the licensee had achieved compliance with the requirements of 10 CFR 50.55a(g).

The inspector reviewed current revisions of the following inservice test procedures against the licensee's current inservice test program requirements:

45J002	"River Water Supply System Operability Test"
45C001	"RHR Service Water System Operability Test"
45D001	"HPCI System Operability Test"
45E001	"RCIC System Operability Test"
48C001	"Emergency Service Water System Operability Test"
45A002	"RHR System Operability Test"
45A001	"Core Spray System Operability Test"
44A001	"Standby Liquid Control System Operability Test"

As a result of this review, the inspector determined that for the High Pressure Core Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) pump tests, there were no provisions for establishing reference speeds as required by the ASME Code, Section XI, Paragraphs IWP-3100 "Inservice Test Procedure," and IWP-3110 "Reference Values," and as is necessary to detect hydraulic change from test to test. This is considered an item of noncompliance as identified in the Appendix (50-331/82-11-02a).

The inspector also determined that inservice test procedures for all pumps included in the program did not require establishing either the reference pump differential pressure or the reference flowrate prior to taking test data. Instead, the procedures required that pump differential pressure or flow be established within a given range. Data was then taken and compared to the acceptance criterion of Table IWP-3100-2 of the ASME Code, Section XI. This practice does not comply with the requirements of the ASME Code, Section XI, Paragraph IWP-3B00 "Inservice Test Procedure." This is considered an item of noncompliance as identified in the Appendix (50-331/82-11-2b).

The licensee provided the inspector with a list of instruments used to obtain inservice test data for pumps. The list included the tolerances to which instrument loops were calibrated, instrument ranges, and normal readings of the parameters measured. The licensee's inservice test program requires that instrument accuracy be at least  $\pm 2\%$  of full scale and that the instrument range be no greater than three times the reference value of the parameter measured. The instrument list, reproduced below, indicates that certain instruments do not meet the range and/or accuracy requirements.

<u>PUMP</u>	<u>QUANTITY MEASURED</u>	<u>INSTRUMENT RANGE</u>	<u>NORMAL READING</u>	<u>ACCURACY</u>
1P-22a, B, C, D	PIT LVL (INLET PRES)	0-100%	55%	1%
	DISCH PRES	0-600 PSIG	265 PSIG	3%*
	FLOW	0-8000 GPM*	2400 GPM	3%*
1P-44A, B	TANK LEVEL (INLET PRES)			
	DISCH PRES	0-30 PSIG	12 PSIG	5%*
	DAY TANK LVL (FLOW)			
1P-99A, B	PIT LVL (INLET PRES)	0-100%	55%	
	DISCH PRES	0-160 PSIG	150 PSIG	5%*
	FLOW	0-1500 GPM	1180 GPM	
1P-117A, B, C, D	RIVER LVL (INLET PRES)	724-764 FT	733 FT	
	DISCH PRES	0-160 PSIG*	2 PSIG	
	FLOW	0-14000 GPM	6000 GPM	2.5%*
1P-211A, B	INLET PRES	0-30 PSIG	12 PSIG	1%
	DISCH PRES	0-500 PSIG	320 PSIG	2.5%*
	FLOW	0-5000 GPM	3020 GPM	2.5%*
1P-216	INLET	30 inHs (VAC)-85 PSIG*	15-25 PSIG	5%*
	DISCH PRES	0-1500 PSIG	1180 PSIG	2.5%*
	FLOW	0-3500 GPM	3000 GPM	1.5%
	SPEED	0-6000 RPM	3720 RPM	2%

<u>PUMP</u>	<u>QUANTITY MEASURED</u>	<u>INSTRUMENT RANGE</u>	<u>NORMAL READING</u>	<u>ACCURACY</u>
1P-22A	INLET PRES			
	DISCH PRES	0-1500 PSIG	1100 PSIG	4%*
	FLOW	0-500 GPM	400 GPM	1%
	SPEED	0-6000 RPM	4000 RPM	2%
1P-229A, B, C, D	INLET PRES	0-200 PSIG*	2 PSI	1%
	DISCH PRES	0-600 PSIG*	165 PSIG	2.5%*
	FLOW	0-20000 GPM*	5000 GPM	2.5%*
1P-230A, B	TANK LVL (INLET, FLOW)			
	DISCH PRES	0-1800 PSIG	1100 PSIG	

\*Denotes instrument characteristic not meeting inservice test program requirements.

The normal readings were used by the inspector in lieu of reference values to determine whether or not instrument ranges were acceptable. A review of test data indicated that the reference values and normal readings were almost the same and that certain instruments clearly do not meet the range requirements. This is considered an item of noncompliance as identified in the Appendix (50-331/82-11-03).

During the previous inspection the inspector had emphasized to the licensee the need to review test instrumentation against inservice test program requirements and take corrective action where necessary, to avoid noncompliance. This recommendation was documented in Inspection Report No. 50-331/81-11. During this inspection, licensee personnel indicated that several instruments had been "looked at" but that a complete review was never performed.

During a technical meeting with Region III staff in our office on September 3, 1982, the licensee stated that an engineering review of installed instrumentation is in progress and will be completed by October 1, 1982. The engineering review is being conducted to determine actual instrument accuracy because the information provided to the inspector contains algebraic sums of loop accuracies. The accuracy of inservice test program instrumentation is considered to be an unresolved item (50-331/82-11-04).

- c. (Closed) Unresolved Item (50-331/81-11-02): Failure to annotate the necessity to fail closed the strainer backwash valves in RHR Service Water System to meet Technical Specification 4.5.c. The inspector reviewed Design Change Request 760, "Installation of RHR-SW-ESW Self-Cleaning Strainers and Their Auxiliaries," initiated in February 1980; Calculation Number C-20, "Effect of Self-Cleaning Strainer Backwash on the Systems;" and "Preoperational Test Procedure for RHR-SW System Strainers 1S-90A and 1S-90B," conducted in April 1980, to determine whether or not

this design change had received appropriate review prior to being performed and whether or not design requirements were verified as having been met following installation.

Page 3 of DCR 760 "Design Requirements," Design Requirement 1 states: "The RHRSW and ESW Pumps meet the design flow and pressure requirements of water to the RHRSW and ESW Systems, respectively, with the addition of the self-cleaning automatic backwash strainers."

Page 1 of Calculation C-20 states, in part: "The purpose of this calculation is to determine what effect a self-cleaning strainer with continuous backwash has on the ESW and RHR service water systems and whether or not the continuous backwash will affect the performance of the ESW and RHRSW pumps in regards to meeting the technical specification requirements."

Page 1 of Calculation C-20 also states, in part: "As can be seen the margin above technical specification with the self-cleaning strainer is marginal for the existing pumps and better for the pumps if they could be restored to "as new" condition. It would be a recommendation that the pumps be restored to "as new" condition and possibly be fit with larger impellers."

Pre-Operational Test Procedure for RHRSW System Strainers 1S-90A and 1S-90B states: "PURPOSE: This procedure, when successfully completed, will verify the operation of the strainer to be in accordance with design requirements."

Data taken during the test included head and flow measurements for single pump and two pump operation in each loop subsystem with the strainer backwash in operation. The data was incomplete as it did not show that each pump met the Technical Specification pump operability limits. The D RHRSW pump total developed head, at the required 2400 gpm flowrate to the RHRSW system was approximately 11.5 feet below the technical specification requirement of 610 feet. The flowrate to the system from the A RHRSW pump, at the required 610 feet total developed head was 300 gpm below the Technical Specification requirement of 2400 gpm.

The inability to meet the design requirement of head and flow to the RHRSW System (upon which technical specification pump operability limits are based) was not detected during the pre-operational test because acceptance criterion for verifying the design requirement were not included in the test. This was contrary to the stated purpose of the test and contrary to 10 CFR 50, Appendix B, Criterion XI, "Test Control", which states in part: "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance

limits contained in applicable design documents... Test results shall be documented and evaluated to assure that test requirements have been satisfied." This is considered an item of noncompliance as identified in the Appendix (50-331/82-11-05).

3. Technical Meeting

On September 3, 1982, members of the Region III staff and representation of the licensee, denoted in Paragraph 1, held a technical meeting in the Region III office to discuss the technical aspects of Items 1 and 2 of the Appendix. The licensee stated that they agreed with the findings. They provided information regarding corrective action that has been taken or is planned.

4. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 2.b.

5. Exit Interview

The inspector met with licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on July 22, 1982. The inspector summarized the purpose and the scope of the inspection and the findings.