



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

MAY 22 1978

Docket No. 50-331/18-9

Iowa Electric Light and Power Company
ATTN: Mr. Duane Arnold
President
IE Towers
P. O. Box 351
Cedar Rapids, IA 52406

Gentlemen:

This refers to the inspection conducted by Mr. H. B. Kister on March 31 through April 7, and April 19-21, 1978; Mr. W. D. Shafer on April 5-7, and 19-21, 1978; and Mr. N. J. Chrissotimos on April 19-21, 1978, of activities at Duane Arnold Energy Center authorized by NRC Operating License No. DPR-49 and to the discussion of our findings with Mr. Hammond at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

No items of noncompliance with NRC requirements were identified during the course of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

Iowa Electric Light
and Power Company

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MAY 22 1978

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

Gaston Fiorelli, Chief
Reactor Operations and
Nuclear Support Branch

Enclosure: IE Inspection
Report No. 50-331/78-09

cc w/encl:
Mr. E. L. Hammond,
Chief Engineer
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC

OFFICE	RIII	RIII	RIII	RIII	RIII	
SURNAME	Shafer/ls	Kister	Chrissotimos	Knop	Fiorelli	
DATE	5/17/78					

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

REGION III

Report No. 50-331/78-09

Docket No. 50-331

License No. DPR-49

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

Facility Name: Duane Arnold Energy Center

Inspection At: Duane Arnold Site, Palo, Iowa

Inspection Conducted: March 31 through April 7, and April 19-21, 1978

Inspectors: *W.D. Shafer* 5-18-78
W. D. Shafer
H.B. Kistler 5-17-78
H. B. Kistler
N.J. Chrissotimos 5-17-78
N. J. Chrissotimos
Approved by: *R.C. Knop* 5-18-78
R. C. Knop, Chief
Reactor Projects Section 1

Inspection Summary

Inspection on March 31 through April 7, and April 19-21, 1978, (Report No. 50-331/78-09)

Areas Inspected: Routine, unannounced inspection of plant housekeeping and cleanliness, review of licensee event reports, review of inspection and enforcement circulars, followup on previous noncompliance and outstanding inspection items, review of plant operations, plant tour, organization and administration, and a special review of the licensee's reactor water cleanup system pipe crack. The inspection involved 105 inspection-hours onsite by 3 NRC inspectors.

Results: Of the eight areas inspected, no items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

Corporate Office

J. A. Wallace, Vice President, Generation
L. Root, Manager, Mechanical and Nuclear Engineering
H. Rehrauer, Supervisor, Project Engineer
D. Gembler, Supervisor, Quality Assurance

Site

*E. Hammond, Chief Engineer
*D. Mineck, Assistant Chief Engineer
*B. York, Operations Supervisor
*J. Gebert, Maintenance Supervisor
*J. Vinqvist, Electrical Maintenance Supervisor
*R. Rinderman, Quality Supervisor
D. Teply, Shift Supervisor Engineer
R. Zook, Shift Supervisor Engineer
C. Mick, Shift Supervisor Engineer
*D. Wilson, Technical Engineer
*J. VanSickle, Engineering Assistant

The inspector also talked with and interviewed several other licensee employees, including members of the technical and operating staff.

*Denotes those present at the exit interview.

2. Reactor Water Cleanup System Pipe Crack

The licensee reported^{1/} to the regional office that a primary system leak had been discovered during an inspection by plant personnel. The reactor had been shut down for refueling on March 17, 1978. Further investigation revealed that there was a through wall crack in the four-inch inlet pipe to the Reactor Water Cleanup System. The subject pipe branches off the eighteen-inch RHR pipe which is connected to the unisolable section of the twenty-two inch recirculation suction pipe in the "B" loop. Specifically, the crack was 1 1/4 inches long and was located radially in the heat affected zone of the pipe to valve (V-27-01) weld at approximately the four o'clock position and approximately five inches from the weldolet.

1/ LER 50-331/78-017, dtd 4/7/78.

a. Weld Repair

The inspector reviewed the licensee's proposed procedure (RP-61/ie-1) for accomplishing the repair. Since a pipe material change (304 to 316L) and new valve were to be installed, a design change was also prepared. The licensee decided to construct a full size mockup including the eighteen inch pipe, weldolet and four inch pipe to check out the necessary tooling and plug and provide training for craftsman that would be involved in the repair. The plugging was similar to that previously used with a high degree of success by Commonwealth Edison for removal and capping of the recirculation pump discharge valve bypass piping. No freeze sealing was planned since the gate valve was available adjacent to the defective weld. A backup plugging method was also devised and tested. The plug and back up were tested under one and one-half times the pressure expected during the repair. The inspector observed the entire developmental program, tests, and equipment checkout. No significant problems were identified.

The repair was subsequently accomplished successfully during the week of April 9.

b. Failure Analysis

The defective weld, including the pipe and valve, was removed intact and transported to Battelle Laboratory for detailed analysis. Preliminary reports have indicated that the failure mode was intergranular stress corrosion cracking. Further detailed analysis is being conducted and the results will be submitted to NRC when completed.

3. Plant Housekeeping and Cleanliness

The inspector reviewed the licensee's administrative controls for maintaining plant cleanliness contained in HCP-1 and CCP-1. No significant changes were noted from the previous year's review. A plant tour was conducted and conditions were noted to be acceptable considering that the plant was in the midst of a refueling outage. Comments regarding accountability controls are contained in Inspection Report 78-08.

4. Review of Licensee Event Reports

A review of reporting, corrective actions, licensee review and evaluation and compliance with regulatory requirements was conducted for the following reportable occurrences:

	<u>Event Title</u>	<u>Event Date</u>	<u>Licensee Report Date</u>
	In office review		
a.	50-331/78-014, MSL Hi-temp switches (2) tripped out of specification (30 day)	2/21/78	3/21/78
	Onsite review		
b.	50-331/78-06, Inoperable shock suppressors on HPCI and Auxiliary steam line (3rd review)	1/18/77	2/1/77
c.	50-331/77-08, Snubber bracket, concrete anchor failures (3rd review of update)	4/5/77	1/20/77
d.	50-331/77-28, CRD Control Module WL switch failure (2nd review)	4/5/77	4/18/77
e.	50-331/77-29, RHR/Fuel Pool Cooling pipe overstressed (2nd review)	4/6/77	1/20/78
f.	50-331/77-57, 62 ESW system capacity (2nd review)	7/14/77	8/5/77
g.	50-331/77-63, Recirculation pump trip press switch (2nd review)	8/4/77	8/24/77
h.	50-331/77-70, 5 shock suppressors found inoperable (3rd review)	5/4/77	1/23/78
i.	50-331/77-93, RCIC steamline Hi-flow out of calibration (2nd review)	12/13/77	12/22/77
j.	50-331/77-95, HPCI failed to reach required speed within analyzed time (14 day)	12/20/77	12/30/77
k.	50-331/77-96, HPCI failed to reach (14 day)	12/27/77	1/9/78

	<u>Event Title</u>	<u>Event Date</u>	<u>Licensee Report Date</u>
l.	50-331/77-97, RWCU isolation valve MOV 2700 failed to close (30 day)	12/27/77	1/23/78
m.	50-331/78-01, HPCI steam leak detection temperature elements (2) failed (14 day)	1/4/78	1/17/78
n.	50-331/78-02, HPCI isolated due to turbine exhaust diaphragm failure (14 day)	1/3/78	1/17/78
o.	50-331/78-04, Containment Hi pressure switches found isolated (14 day)	1/11/78	1/25/78
p.	50-331/78-04, Potential for a reactor period of less than 5 seconds during reactor trip (14 day)	1/12/78	1/26/78
q.	50-331/78-09, Containment radiation monitor sample pumps found secured (30 day)	1/26/78	2/24/78
r.	50-331/78-010, RSCS test not conducted per Technical Specifications (30 day)	1/30/78	3/1/78
s.	50-331/78-012, "B" core spray detection alarm found pulled	1/16/78	3/3/78
t.	50-331/78-013, MCPR found to be below flow adjusted value (30 day)	2/18/78	3/14/78

The licensee event report reviewed in the office is considered closed. The inspector's onsite review of reports included discussions of each event with licensee representatives as required, examination of the report, and other documents related to the particular areas reviewed. Comments are as follows:

Item b. The inspector reviewed the status of the engineering analysis regarding the subject failures. The analysis has been completed regarding the HPCI snubber failure and corrective action included adjustment of the snubber bracket. The review of the auxiliary steam line had also been completed and included installation of an anchor lug on the pipe. The work has not yet been completed. This item will remain open pending final submittal of supplementary report.

- Item c. As of the date of this inspection, the licensee stated that one-half of the anchors that were scheduled for a torque check, had been checked. No problems were identified.
- Item d. The licensee stated that the subject level switches had been checked and two failures were noted. The failure mode appeared to be attributed to sticking floats. General Electric has been requested to determine the problem. This item will remain open pending determination of the cause of failure.
- Item e. The inspector reviewed NDE documentation and noted that the test procedure (STP 45A002) had been changed to require venting prior to pump start. No further concerns were identified.
- Item f. The inspector discussed the status of the design review of the ESW system with IE engineering. The licensee stated that procurement of new pumps, strainers and valves was in progress and plans were to perform the modification during the 1979 refueling outage subject to receipt of all necessary material.
- Item g. The licensee stated that the instrument vendor had recommended that the instrument not be depressurized to test. Procedures were changed and no further problems were noted.
- Item h. The inspector did not identify any further problems.
- Item i. The inspector reviewed the three subsequent surveillance tests, no problems were identified. For long-term, a design review was initiated.
- Item j&k. The inspector observed the HPCI turbine lube oil pump reconditioning. There appeared to be no significant problems with the pump. The licensee, on recommendation of the vendor representative, cleaned out the oil pump and flushed the oil system. Also, as a result of finding water in the lube oil, the cooler was hydrotested. No leaks were found. The HPCI will be tested during reactor startup. This item will remain open pending results of the test.

- Item l. The licensee stated that the problem was found to be an out of adjustment open limit switch. The switch was adjusted and the valve and operator tested out satisfactorily. With regard to the MOV 2700 seal infunction in^{2/} the open direction which had been removed temporarily, the licensee stated that the subject function was still removed and that Corporate Engineering had been requested to evaluate the advisability of maintaining the throttle open capability on a permanent basis. This will be reviewed again during a subsequent inspection.
- Item m. The corrective action was reviewed and no further problems were identified.
- Item n. The event was reviewed and no further problems were identified.
- Item o. The inspector reviewed the personnel reinstruction with the Assistant Chief Engineer and the Electrical Maintenance Supervisor, no further problems were identified.
- Item p. The inspector reviewed the transient and subsequent reactor trip. As stated in the event report, all indications point toward a pressure transient and subsequent trip from high flux due to pressure fluctuations caused by turbine control valve testing. The licensee changed their test procedure so that valve testing would not be permitted at the specific power level and valve position. The licensee reported the flux transient since they were unable to definitely state that a period of less than 5 seconds did not occur due to the short duration of the transient. The RPS performed properly and no further problems were identified.
- Item q. The inspector reviewed the licensee's reinstruction with the Operations Supervisor and the Radiation Protection Engineer. No additional problems were identified.
- Item r. The inspector noted that STP 43B003 had been clarified. Discussion with the Shift Supervisor involved indicated that the clarification was adequate. No additional problems were identified.

2/ Inspection Rpt 50-331/78-02, dtd 2/16/78.

Item s. The item was discussed in detail with the Operations Supervisor. The inspector was provided with a memorandum which was issued to the operating staff emphasizing the Technical Specification requirement. Further discussion indicated that this was a nuisance alarm during startups since the lower plate instrument sensing line is shared with the CRD pressure sensing line and when control rods are being moved extensively pressure oscillations caused the alarm to be frequently activated. The Operations Supervisor has formally requested a design review to determine if the nuisance alarm can be eliminated. No additional problems were identified at this time.

Item t. The inspector reviewed the operators log during the time of the event and noted that the indicated actions had been taken in accordance with Technical Specifications. No additional problems were identified.

During the review of the above licensee event reports, the inspector noted that the licensee had identified and satisfactorily corrected 4 items related to Technical Specifications requirements.

5. Review of Inspection and Enforcement Circulars

- a. (Closed) IEC-77-11, regarding leakage of containment isolation valves with resilient seats. The licensee has completed their review and considered their program regarding control of limited life items adequate.
- b. (Closed) IEC 77-14, regarding separation of contained water systems from noncontaminated plant systems. The licensee's review concluded that there were no permanent interconnecting piping systems. The possibility of any temporary connections being used was also reviewed and several long-term recommendations are being considered.
- c. (Closed) IEC 77-16, regarding emergency diesel generator electrical trip lockout features. The inspector reviewed the licensee's evaluation of the circular recommendations. The licensee's conclusion was that the protective circuitry is in conformance with the Technical Specifications and that performance is demonstrated by appropriate tests. However, it was also concluded that the diesel generator simulated automatic start test (STP 48A002) does not

require testing of the diesel trip bypass features. Subsequently, the procedure was revised and the test was run. The results of the test revealed that, although the bypass trip features functioned properly once the diesel was running (none would shut down the diesel) if in fact there was a passive failure of one prior to the start signal) of the relays, the diesel would not automatically start. This condition, however, (relay failure) does annunciate an alarm in the control room (generator lockout) which alerts the operator of a problem. The licensee stated at the exit interview that a design review would be initiated immediately to review this condition. The licensee concluded that no immediate safety significance exists since a passive failure would be alarmed and the necessary steps taken in accordance with the Technical Specifications. The design reviews will be evaluated during and subsequent inspection.

6. Followup on Previous Noncompliance and Outstanding Inspection Items

- a. (Closed) IR 50-331/76-01, the inspector noted that the 1200 series procedures have been issued.
- b. (Closed) 50-331/77-13, Infraction 4: The inspector reviewed the licensee's corrective action and no additional concerns were identified.
- c. (Closed) 50-331/77-14, Deficiency: The inspector reviewed the licensee's corrective action, no additional concerns were identified.
- d. (Closed) 50-331/77-15, Infraction: The inspector noted that the control room drawings were being maintained up-to-date.
- e. (Closed) OII 77-3, regarding inspector qualifications. The inspector reviewed the bases for qualifications which are now attached to the certifications.
- f. (Closed) OII 77-10, regarding inspection of all torus strainers during the 1978 refueling outage. The licensee stated that the inspection was conducted and no damage noted.
- g. (Closed) OII 75-18, regarding timeliness of design change review. The inspector noted that review of completed design changes has been slow but orderly with the delays mostly attributed to the drawing changes. No further concerns were identified.

7. Review of Plant Operations

The inspector conducted a review of the routine plant operations for the period of January 1, 1978 through March, 1978, by examination of the control room log books, shift engineer log books, plant operating orders, jumper and lifted lead log book, water chemistry records and licensee deviation reports. The inspector noted that the log book entries contain sufficient detail to communicate existing plant conditions, and that log book reviews were being conducted by management. This review was conducted to confirm that facility operations is in conformance with the requirements established in the Technical Specifications, 10 CFR, and administrative procedures. No significant concerns were identified.

8. Plant Tour

The inspector conducted a plant tour of the turbine and reactor buildings to determine that monitoring instrumentation is recording as required, radiation controls are properly established, the adequacy of housekeeping, the existence of fluid leaks and pipe vibrations are minimal, pipe hangar and seismic restraint equipment have proper oil levels, equipment caution or lockout tag information corresponds to that identified in the control room, and selected valve positions or equipment start position switches are correct. Discussions were conducted with the control operators relating to the reasons for selected lighted annunciators. The inspector also noted at the time of the inspection that control room manning was in conformance with the requirements of 10 CFR 50.54(k) and the facility technical specifications. No significant concerns were identified.

9. Organization and Administration

A review of the licensee's onsite organization structure was conducted to determine that personnel qualification levels are in conformance with the Technical Specifications, authorities and responsibilities are as delineated in the Technical Specifications, operating crew composition and licensed personnel requirements are in compliance with the Technical Specifications, onsite and offsite review committee membership qualifications are satisfactory and licensee organization and structure changes have been reported to the NRC. No items of noncompliance or deviations were identified.

10. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on April 21, 1978. The inspectors summarized the scope and findings of the inspection.

The startup prerequisites were also discussed and the licensee confirmed that the modified pipe whip restraints would be installed prior to startup. It was announced that this inspection was considered the turnover of project inspector responsibilities to Mr. W. D. Shafer.