



UNITED STATES  
ATOMIC ENERGY COMMISSION  
DIVISION OF COMPLIANCE  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

TELEPHONE  
(312) 858-2660

A. RO Inspection Report No. 050-331/73-18

Transmittal Date : January 23, 1974

Distribution:  
RO Chief, FS&EB  
RO:HQ (5)  
✓ DR Central Files  
Regulatory Standards (3)  
Licensing (13)  
RO Files

Distribution:  
RO Chief, FS&EB  
RO:HQ (4)  
L:D/D for Fuel & Materials  
DR Central Files  
RO Files

B. RO Inquiry Report No. \_\_\_\_\_

Transmittal Date : \_\_\_\_\_

Distribution:  
RO Chief, FS&EB  
RO:HQ (5)  
DR Central Files  
Regulatory Standards (3)  
Licensing (13)  
RO Files

Distribution:  
RO Chief, FS&EB  
RO:HQ  
DR Central Files  
RO Files

C. Incident Notification From: \_\_\_\_\_  
(Licensee & Docket No. (or License No.))

Transmittal Date : \_\_\_\_\_

Distribution:  
RO Chief, FS&EB  
RO:HQ (4)  
Licensing (4)  
DR Central Files  
RO Files

Distribution:  
RO chief, FS&EB  
RO:HQ (4)  
L:D/D for Fuel & Materials  
DR Central Files  
RO Files

LB



DR FILES

UNITED STATES  
ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

TELEPHONE  
(312) 858-2660

JAN 23 1974

Iowa Electric Light and Power Company  
ATTN: Mr. Charles W. Sandford  
Vice President, Engineering  
Security Building  
P. O. Box 351  
Cedar Rapids, Iowa 52405

Docket No. 50-331

Gentlemen:

This refers to the inspection conducted by Mr. D. C. Boyd of this office on December 26-27, 1973, and January 7, 1974, of activities at the Duane Arnold site authorized by AEC Construction Permit No. CPPR-70 and to the discussion of our findings with you, Messrs. Wallace, Hunt and others of your staff at the conclusion of the inspection.

A copy of our report of this inspection is enclosed and identifies the areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with plant personnel, and observations by the inspector.

No violations of AEC requirements were identified within the scope of this inspection.

In accordance with Section 2.790 of the AEC'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 AEC's Public Document Room. If this report contains any information that you or your contractors believe to be proprietary, it is necessary that you make a written application to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. Any such application must include a full statement of the reasons for which it is claimed that the information is proprietary, and should be prepared so the proprietary information identified in the application is contained in a separate part of the document. Unless we receive an application to withhold information or are otherwise contacted within the specified time period, the written material identified in this paragraph will be placed in the Public Document Room.

Iowa Electric Light  
and Power Company

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JAN 23 1974

No reply to this letter is necessary; however, should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

James G. Keppler  
Regional Director

Enclosure:

RO Inspection Rpt No.  
050-331/73-18

cc: G. Hunt, Chief Engineer  
DAEC

bcc: RO Chief, FS&EB  
RO:HQ (4)  
Licensing (4)  
✓ DR Central Files  
RO Files  
PDR  
Local PDR  
NSIC  
DTIE  
OGC, Beth, P-506A

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

RO Inspection Report No. 050-331/73-18

Licensee: Iowa Electric Light and Power Company  
Security Building  
P. O. Box 351  
Cedar Rapids, Iowa 52405

Duane Arnold Energy Center  
Palo, Iowa

License No. CPPR-70  
Category: B

Type of Licensee: BWR, 538 Mwe

Type of Inspection: Special, announced

Dates of Inspection: December 26-27, 1973 and January 7, 1974

Dates of Previous Inspection: December 17-19, 1973

Principal Inspector: *D.C. Boyd*  
Mr. D. C. Boyd

1-23-74  
(Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: *D.C. Boyd for*  
Mr. D. M. Hunnicutt  
Reactor Testing and Startup Branch

1-23-74  
(Date)

SUMMARY OF FINDINGS

Enforcement Actions

There were no enforcement action as a result of this inspection.

Licensee Action on Previously Identified Enforcement Matters

All previously identified enforcement matters have been satisfactorily resolved.

Design Changes

Not examined during this inspection.

Unusual Occurrences

No unusual occurrences were determined or reported during this inspection.

Other Significant Findings

A. Current Findings

Status Report

1. Construction completion - 96%
2. Fuel load target date - February 1974
3. Preoperational/acceptance testing - 25%
4. Integrated leak rate testing. Preliminary results indicate that an acceptable test has been completed.

B. Status of Previously Reported Unresolved Items

Not examined during this inspection.

Management Interview

Persons Present

Iowa Electric Light and Power (IELP)  
Duane Arnold Energy Center (DAEC)

C. Sandford, Executive Vice President, IELP  
G. Ward, Licensing Coordinating, IELP  
J. Wallace, Production Manager, IELP  
G. Cook, Quality Assurance Manager, IELP  
G. Hunt, Chief Engineer, DAEC  
E. Hammond, Assistant Chief Engineer, DAEC  
R. Lessly, Mechanical-Nuclear Engineer, DAEC

Directorate of Regulatory Operations, Region III

D. Boyd, Principal Inspector

Subjects Discussed

This inspection and the management interview were devoted entirely to subjects related to the performance of the integrated leak rate test. (ILRT)

## REPORT DETAILS

### Persons Contacted

#### Iowa Electric Light and Power (IELP) Duane Arnold Energy Center (DAEC)

C. Sandford, Executive Vice President, IELP  
G. Ward, Licensing Coordinator, IELP  
J. Wallace, Production Manager, IELP  
G. Cook, Quality Manager, IELP  
G. Hunt, Chief Engineer, DAEC  
E. Hammond, Assistant Chief Engineer, DAEC  
R. Lessly, Mechanical-Nuclear Engineer, DAEC  
L. Root, Assistant Project Manager, DAEC  
R. York, Operating Supervisor, DAEC  
D. Flanagan, Project Engineer (ILRT Test Director), IELP

#### Bechtel Power Corporation

G. Cranston, ILRT Test Director  
R. Dundas, Assistant ILRT Test Director  
W. Kooy, Assistant ILRT Test Director

#### 1. Integrated Leak Rate Test (ILRT)

##### a. Procedure Review

Previous Regulatory inspection reports<sup>1/</sup> identify earlier procedure review activities by Licensing (L) and Regulatory (RO). Prior to this inspection, the inspector was provided with the final approved copy of the primary reactor containment integrated leakage rate test procedure, Revision 7, December 18, 1973. The inspectors review of this procedure, and the subsequent test data, indicate that this testing satisfies the requirements of 10 CFR 50 Appendix J and ANSI N45.4. See Attachment A for procedure outline.

##### b. Type B and C Test Data and Records

The inspector reviewed the local leak rate testing data for all the Type B and Type C tests. The inspector verified

<sup>1/</sup> RO Inspection Reports No. 050-331/73-7 , -11, -13, and -16.

that the testing included all of the items listed in the technical specification Tables 3.7.2 (valves requiring Type C local leak rate testing) and Table 3.7.1 (primary containment components requiring Type B local leak rate testing). The inspector reviewed the records of individual item volume calculations which are used in the pressure decrease method of leak rate determinations. The inspector reviewed the instrumentation calibration records for all of the instruments used in the Type B and C tests and found that all were calibrated within the last three months and that all of the calibration instruments are traceable to the National Bureau of Standards.

A preliminary summation, performed by the licensee, of the Type B and C local leak rate data, indicates that the total leakage past these valves and penetrations is less than 1/30th of that allowed by 10 CFR 50 Appendix J.

The inspector was informed that several test deviations exist due to the late deliver of certain valves, or due to valves in an "in repair" status. In each case the licensee provided records (deviation reports, ILRT test log entries, and "as built" master P&ID drawings) to verify that each of these exceptions was identified and that each could be local leak rate tested at a later time. The inspector was assured that each of these items would be identified in the final test report and that as each item was corrected and tested that the leakage determined would be added to the total. Regulatory will follow these corrective actions.

c. Type A Test Data and Records

The inspector reviewed Type A test data and records which indicate that the Type A testing was performed in 10 phases, as follows:

- Phase 1 - Test Preparation
- Phase 2 - Pressurization to 14 psig
- Phase 3 - Local leak survey at 14 psig
- Phase 4 - Pressurization to reduced test pressure (27 psig)
- Phase 5 - Integrated leak rate test at reduced test pressure
- Phase 5-A - Superimposed known leak rate test (27 psig)
- Phase 6 - Pressurization to proof test pressure (70 psig)
- Phase 7 - Depressurization to peak test pressure (54 psig)

Phase 8 - Integrated leak rate test at peak test pressure  
Phase 8-A - Superimposed known leak rate test (54 psig)  
Phase 9 - Depressurization to zero psig  
Phase 10 - Drywell to torus bypass test (1.7 psig)

The inspector witnessed portions of the testing at the 27 psig and at the 54 psig pressure conditions. The inspection included an audit of approximately 10% of the valves associated with the test. This audit indicates that the valves (selected at random from the approved valve lineup lists) were properly tagged and positioned. No valve line up discrepancies were found.

The inspection included a review of the calibration records for the instrumentation used in the performance of the Type A testing. The calibration data was current (within three months of the test performance) and in each case the calibration instrumentation was traceable to the National Bureau of Standards (NBS).

The instrument calibration records examined included the following:

Copper thermohm detectors L&N (13)  
Numatron Numerik display unit L&N  
Dewpoint temperature indicating system  
Dewpoint temperature probes (8 panametric & 4 Honeywell)  
Precision pressure gauges (2) (Texas Instruments)

- a. Fused quartz bourdon capsules 0-49 psia
- b. Fused quartz bourdon capsules 0-100 psia

Pressure gauges (2) Wallace and Tierman (0-100 psia)  
Flowmeters (2) Brooks

- a. 1.69 to 1.4 scfm of air @ 54 psig, 70°F
- b. .79 to 7.6 scfm of air @ 27 psig, 70°F

Flowmeters (5) Brooks

- a. 20-200 cc/min of air @ 54 psig, 70°F
- b. 200-2000 cc/min of air @ 54 psig, 70°F
- c. 50-5000 cc/min of air @ 27 psig, 70°F

The inspector met with the Bechtel ILRT Test Director,

and the Bechtel Assistant ILRT Test Director to review their records, observe the plotting of the data, and to discuss various aspects of the computer print-out sheets. The inspector observed that independent plots were also being maintained by DAEC personnel and that the Bechtel and DAEC plots were in agreement. The data reviewed indicated the following:

The measured leak rate at 27 psig is 0.153 percent per 24 hours by weight percent of air.

The superimposed known leak rate verification test at 27 psig verified that the accuracy of the test data is within the acceptability limits of 10 CFR 50 Appendix J.

The measured leak rate at 54 psig is .129 percent per 24 hours by weight per cent of air (maximum leak rate allowable by the plant technical specifications is 2.0 percent).

The superimposed known leak rate test at 54 psig verified that the accuracy of the test data is within the acceptability limits of 10 CFR 50 Appendix J.

The testing at each pressure level was maintained for sufficient time periods (four hours minimum) to assure that stabilization had occurred. (See Attachment A, for listing of pressures and times.)

d. Drywell to Torus Bypass Test

The inspector discussed the preliminary indications determined as a result of this test. (Telephone conversation with IELP Test Director on 1-2-74). The preliminary findings are that the measured bypass area is the equivalent of 0.003 inch diameter orifice. This compares favorably with the technical specification allowable of "--less than the equivalent area of a one inch diameter orifice."

The licensee reported two exceptions that will require corrective follow-up action. First, during the preoperational testing of the position indication switches for each of the vacuum breaker valves it was found that several of these switches had a tendency to stick. The sticking is believed to be due to excessive lubricant on the switch actuator arms. IELP reports that it is their intent to replace all of these switches with new, clean switches, and then repeat this portion of the

preoperational test. The data obtained from the operable switches indicate that a valve movement of approximately 0.05 inches would actuate the switch and be indicated in the control room.

Secondly, during the initial attempt to perform the test at 1.7 psig it was found that a significant leak path existed through each of the vacuum breaker pipe drain lines. These drain lines originate on the drywell side of the vacuum breaker valves and terminate below the water level in the torus. It was determined that the extension of these drain lines below the water level was of insufficient depth to prevent "bubble through" at the 1.7 psig test pressure. The licensee plugged off these lines during this test, but have identified plans to lengthen these lines such that they extend below the surface of the torus water to the same depth as the vacuum breaker lines. The licensee intends to perform local leak rate tests on these lines once the modification is complete. Regulatory will follow both of the above identified corrective actions.

Attachment A

Attachment A

