



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

TELEPHONE  
(312) 858-2660

A. RO Inspection Report No. 050-331/74-13

Transmittal Date : August 13, 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 Fuels & 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 Fuels & Materials  
DR Central Files  
RO Files



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

TELEPHONE  
(312) 858-2660

AUG 13 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. Feierabend of this office on July 5 and 6, 1974, of activities at Duane Arnold site authorized by AEC License No. DPR-49 and to the discussion of our findings with you and 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

AUG 13 1974

- 2 -

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. 050-331/74-13

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

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Report of Operations Inspection

RO Inspection Report No. 050-331/74-13

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. DPR-49  
Category: B

Type of Licensee: BWR, 538 Mwe

Type of Inspection: Special, Announced

Date of Inspection: July 5&6, 1974

Dates of Previous Inspection: May 22-24, and June 6, 1974 (Operations)

Principal Inspector: *C. D. Feierabend*  
C. D. Feierabend

*8/9/74*  
(Date)

Accompanying Inspector: None

Other Accompanying Personnel: None

Reviewed By: *R. C. Knop*  
R. C. Knop, Senior Inspector Projects  
Unit 1 Operations Branch

*8/9/74*  
(Date)

## SUMMARY OF FINDINGS

### Enforcement Action

None

### Licensee Action on Previously Identified Enforcement Matters

Not inspected.

Design Changes: Not applicable.

### Unusual Occurrences

1. An unexpected Group I isolation occurred immediately after initiation of the test of turbine trip at approximately 70% of rated power. Some of the test data was not available because of the isolation and because the computer failed to record information approximately after 2 seconds after the trip was initiated. (Paragraph 4)
2. The high pressure coolant injection (HPCI) system failed to inject into the reactor vessel during startup testing. (Paragraph 5)
3. Failure of a motor support housing on an outboard core spray injection valve was identified during an operability test of the system. (Paragraph 6)

### Other Significant Findings

#### A. Current Findings

Startup testing has been completed through the 75% power level.

#### B. Unresolved Items

1. Licensee evaluation of startup test results for turbine trip test. (Paragraph 4)
2. Operability of HPCI system. (Paragraph 5)
3. Licensee evaluation of failure of motor housing for core spray injection valve operator. (Paragraph 6)

#### C. Status of Previously Reported Unresolved Items

None.

### Management Interview

A Management Interview was conducted with Messrs. Wallace, Hunt, York, Moen, and Rinderman on July 6, 1974, at the conclusion of the inspection. The inspector stated that the purpose of the inspection was to witness performance of the turbine trip test and discussed the scope of the inspection.

The inspector stated that his observation was that crew performed well during the transient. He stated that all systems appeared to function as designed, with the exception that isolation of the main steam lines (Group I isolation) was not expected. The licensee stated that the reason for the isolation had not yet been identified and that investigation was continuing.

The inspector stated that this was his first opportunity to observe testing at this facility and he was not yet fully knowledgeable of the licensee's system of documentation, therefore review of documentation of startup test data will be included in subsequent inspections. The licensee stated that the test data had not been sufficiently evaluated to determine if sufficient information had been obtained from the test, because of the isolation. The licensee also stated that there did not appear to be any results that would preclude performance of the test at 100% of rated power which will demonstrate plant response to the most severe turbine trip transient.

The licensee stated that investigation of the failure of the HPCI system to inject into the vessel indicated that an expansion of the scope of the surveillance testing is needed to provide assurance that the injection valve will open. The inspector agreed, and stated that this is considered unresolved at this time.

The licensee stated that failure of the core spray valve motor operator housing did not make the system inoperable. The inspector agreed, but stated that failure during testing could have made the system inoperable, if failed in the closed position, until the valve could be opened manually.

The licensee stated that the two occurrences, i.e. failure of the HPCI to inject and failure of the motor housing, would be reported as abnormal occurrences. The licensee provided the inspector with handwritten copy of the initial report in lieu of a telephone and telegram.

## REPORT DETAILS

### 1. Persons Contacted

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

C. Sandford - Executive Vice President  
J. Wallace - General Production Manager  
G. Hunt - DAEC Chief Engineer  
L. Root - Assistant Project Manager  
B. York - Operations Supervisor  
D. Mineck - Shift Supervising Engineer  
D. Kalavitinos - Shift Supervising Engineer  
D. Moen - Reactor & Plant Performance Engineer  
R. Rinderman - Quality Supervisor  
R. Hannen - Test Engineer  
D. Wilson - Results Engineer

#### General Electric Company (GE)

J. M. Miller - Site Manager  
J. Nickle - Startup Supervisor  
J. Salisbury - Lead TD&A Engineer  
E. Dean - TD&A Engineer

### 2. Startup Test STI-31 Loss of Offsite Power Test (Performed June 8, 1974)

The inspector reviewed preliminary test results and examined the traces on the transient recorder for the loss of offsite power test. The inspector discussed the results with members of the licensee's staff and vendor test personnel.

The test results had received a preliminary evaluation on site, however, the data had not yet been evaluated by the NSSS vendor design staff. Licensee evaluation of the preliminary test results indicated that the acceptance criteria specified for the test had been met. The records indicated that reactor power peaked at 27% (from 24%) 0.5 seconds after the turbine trip. The reactor protection system (RPS) trip and Group I isolation occurred at 15.6 seconds. Three relief valves operated normally to control pressure.

The reactor vessel water level went offscale (low) so minimum level was not recorded. The level dropped sufficiently to initiate the RCIC system (low-low water level) approximately 21 minutes after the trip. Operator observation indicated that the level stabilized at an indicated "-1 inch," approximately 37 inches below pretest level.

These results were considered acceptable by site NSSS and licensee test personnel.

The test identified one abnormal occurrence, loss of power to busses supplying power to the LPCI injection valve motors. The occurrence was reported<sup>1/</sup> in accordance with Technical Specification requirements.

3. Startup Test No. STI-27, Turbine Trip at 50% of Rated Power

The licensee had scheduled a turbine trip at 50% power to be performed prior to increasing power above that level. An inadvertent trip occurred on June 25, 1974, initiated during a surveillance test. The transient recorder was not monitoring system responses, however, the licensee was able to evaluate the overall plant response to the transient from the information available on plant recorders and computer printouts. Based on the data obtained, the licensee determined that there was no need to perform the test at the 50% level, providing that the test was again scheduled prior to operation above 85% power.

4. Startup Test No. STI-27, Turbine Trip at 70% of Rated Power

The inspector observed final preparations for performance of the test, reviewed the test procedure, observed initiation of the test and responses of personnel and plant systems and examined the transient recorder recording of the event.

a. Preparation

The test was scheduled for 11:00 p.m. so that the transient would be performed at a time of lower system power demand and so that a double shift of licensed operator personnel would be available to participate in the test. The personnel were briefed concerning their assignments of responsibility during the test prior to initiating the trip.

Reactor power was maintained at approximately 78% as a portion of the fuel "preconditioning" program, then lowered to approximately 70% for initiation of the trip.

The transient was initiated by actuating the manual turbine trip. Immediately following the turbine trip (approximately 3 to 4 seconds) a Group I isolation occurred. This was not expected nor desirable for the test, as the reactor pressure response was affected by the MSIV closing and consequently affected the test data for the planned transient. In addition, the plant computer quit approximately 2 seconds after initiation, so much of the expected record of component operation was not recorded.

1/ Licensee Abnormal Occurrence Report No. DPR 49/74-10 dated 6/18/74.

The transient recorder traces did not identify any significant deviation, however, the magnitude of the signals was not readily apparent to the inspector, as this required additional information concerning the recorder gain setting, etc., which will be used by the test engineers in completing their evaluations. Although the licensee had not completed preliminary evaluation, it appeared that sufficient data may have been obtained for assurance that the test can be safely performed at 100%.

5. High Pressure Coolant Injection (HPCI) System Test

The inspector observed performance of a HPCI system test intended to inject into the reactor vessel. The test failed, as the injection valve did not receive a signal to open, and so no injection was completed. The HPCI system was declared inoperable and the surveillance testing required by Technical Specifications for inoperable HPCI system was initiated. The inspector accepted a "24 hour notification" letter report of the abnormal occurrence which was followed by a formal notification of the event.

Investigation of the cause identified moisture in a limit switch associated with the HPCI turbine steam supply valve, which provides the signal to open the injection valve. The licensee will investigate the need to expand the scope of HPCI system surveillance.

Operability status of the HPCI system remains unresolved pending resolution of the deficiencies identified during the test. Details of the occurrence are included in the licensee's report to RO:III.

6. Core Spray System Valve Motor Operator Failure

When the HPCI system failed to inject (Paragraph 5 above) the system was declared inoperable and an operability test of the core spray system was stated. The test requires that the outboard core spray injection valve be closed prior to testing the system. The valve did not respond to a signal from the control room switch to close. The licensee immediately initiated cooldown procedures, proceeding to cold shutdown conditions in accordance with Technical Specification requirements.

Investigation of the failure verified a failure of the motor housing which allowed the drive gear to disengage from the valve operator drive train. Examination of the break in the casting did not provide immediate identification of the cause of failure.

The function of the valve involved is to close during testing of the core spray system. The only other logic associated with the motor operator is that a core spray initiation signal will override and open the valve, if a system test is in progress.

2/ Licensee Abnormal Occurrence Report No. AO-50-331/74-15 dated 7/16/74.

The licensee manually closed the valve and performed the core spray operability test, then returned the valve to the open position and locked it open, to assure core spray system operability.

The licensee determined that the failure could have occurred while the valve was in the closed position during an operability test, and so would have rendered the system inoperable for a short period of time (until it could have been opened manually). Therefore, the licensee provided the inspector with a "24 hour notification" letter report of the Abnormal Occurrence which was followed by a formal notification of the occurrence.

The inspector verified that the failure did not affect manual operation of the valve nor indication of valve position in the control room. Licensee investigation of the cause is continuing. This item is considered unresolved pending completion of licensee investigation. Additional information is included in the licensee's report <sup>3/</sup> to RO:III.

3/ Licensee Abnormal Occurrence Report No. AO-50-331/74-16, dated 7/16/74.