DSB

Iowa Electric Light and Power Company

September 24, 1979
DAEC-79-188

Mr. James G. Keppler, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission - Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Licensee Event Report No. 78-017 UPDATE REPORT
(14 day) PREVIOUS REPORT
DATED 040778

File: A-118a

Dear Mr. Keppler:

In accordance with Appendix A to Operating License DPR-49, Technical Specifications and Bases for Duane Arnold Energy Center and Regulatory Guide 10.1, please find attached a copy of the subject Licensee Event Report. (Total of 3 copies transmitted)

Very truly yours,

E L Hammond /lh

Ellery L. Hammond
Chief Engineer
Duane Arnold Energy Center

Docket 50-331

attachment
ELH/JCZ/lh

cc: Director, Office of Inspection and Enforcement (40)
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Director, Management Information and Program Control (3)
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

7910010396

SEP 27 1979

NRC FORM 366 (7-77)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

UPDATE REPORT
PREVIOUS REPORT DATE 4/7/78

CONTROL BLOCK: ① (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | Licensee Code: I A D A C 1 ② | License Number: 0 0 - 0 0 0 0 0 - 0 0 ③ | License Type: 4 1 1 1 1 ④ | CAT ⑤

CON'T
01 | Report Source: L ⑥ | Docket Number: 0 5 0 0 0 3 3 1 ⑦ | Event Date: 0 3 2 5 7 8 ⑧ | Report Date: 0 9 2 4 7 9 ⑨

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES ⑩

02 During an inspection of primary piping inside the primary containment, a
03 small leak was observed next to the reactor water cleanup inboard manual
04 isolation valve. Investigation revealed a hairline through wall crack on
05 the inboard side of the valve in the heat effected zone. Subsequent UT
06 examination revealed a crack indication in the piping just outboard of
07 the same valve. Primary system integrity requirements listed in techni
08 cal specification 3.6.G.

09 | System Code: C G ⑪ | Cause Code: X ⑫ | Cause Subcode: Z ⑬ | Component Code: P I P E X X ⑭ | Comp. Subcode: B ⑮ | Valve Subcode: Z ⑯

⑰ LER/RO Report Number: Event Year 7 8 | — | Sequential Report No. 0 1 7 | / | Occurrence Code 0 1 | Report Type T | — | Revision No. 1

Action Taken: C ⑱ | Future Action: Z ⑲ | Effect on Plant: Z ⑳ | Shutdown Method: Z ㉑ | Hours: 0 0 0 0 ㉒ | Attachment Submitted: Y ㉓ | NPRD-4 Form Sub.: N ㉔ | Prime Comp. Supplier: A ㉕ | Component Manufacturer: S 2 8 0 ㉖

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS ㉗

10 Laboratory analysis performed by Battelle indicates cracking caused by
11 intergranular stress corrosion. Post installation grinding possible con
12 tributing factor to crack initiation. Replaced 304 stainless pipe sectio
13 n with 316L stainless pipe. Also replaced valve. The lower carbon content
14 316L should inhibit further stress corrosion cracking in the line.

15 | Facility Status: H ㉘ | % Power: 0 0 0 ㉙ | Other Status: NA ㉚ | Method of Discovery: B ㉛ | Discovery Description: Routine Inspection ㉜

16 | Activity Released: Z ㉝ | Content of Release: Z ㉞ | Amount of Activity: NA ㉟ | Location of Release: NA ㊱

PERSONNEL EXPOSURES
17 | Number: 0 0 0 ㊲ | Type: Z ㊳ | Description: NA ㊴

PERSONNEL INJURIES
18 | Number: 0 0 0 ㊵ | Description: NA ㊶

LOSS OF OR DAMAGE TO FACILITY ㊸
19 | Type: Z ㊷ | Description: NA

PUBLICITY
20 | Issued: Y ㊹ | Description: PRESS RELEASE, 3-28-78 ㊺ | NRC USE ONLY

NAME OF PREPARER J. C. Zimmerman PHONE: 319-851-5611

GPO 917-926

DUANE ARNOLD ENERGY CENTER

Iowa Electric Light and Power Company

LICENSEE EVENT REPORT-Supplemental Data

Docket No. 050-0331

Licensee Event Report Date: Update Report Sept. 24, 1979 Previous Report Dated 4/7/78

Reportable Occurrence No: 78-017, Rev. 1

Event Description

During an inspection of primary piping inside the primary containment, a small leak was observed next to the reactor water cleanup inboard manual isolation valve. Investigation revealed a hairline through wall crack on the inboard side of the valve in the heat effected zone. Subsequent UT examination revealed a crack indication in the piping just outboard of the same valve. Primary system integrity requirements listed in Technical Specification 3.6.G.

Cause Description

An analysis performed by Battelle Columbus Laboratories has determined the cause of the subject RWCU system pipe cracking to be intergranular stress corrosion. All cracking took place in the sensitized region adjacent to the pipe-to-valve weld. In this particular case, post weld cold work (grinding) done on the affected area of the pipe, may have been a contributing factor to the crack initiation.

The Battelle analysis included both non-destructive and destructive tests designed to determine the conditions and mechanisms responsible for the material failure. The test results indicated that the Heat Affected Zone (HAZ) was highly sensitized despite procedural controls over the weld interpass temperature. This condition is caused by the inability to control local metal temperatures while welding small diameter pipe, and the relatively large carbon content of the 304 stainless steel used in the system. Considering that the potential for undissolved oxygen to be present in the RWCU system is high during idle or shutdown periods, and assuming in-service and residual stresses of sufficient magnitude existed, it is possible that the necessary conditions for the initiation and propagation of stress corrosion cracks were present at the failure location.

Corrective Action

The degree to which sensitization occurs in the HAZ is dependent upon the temperature to which the material is heated, and the carbon content of the steel. To reduce the amount of local sensitization, and therefore increase resistance to corrosion, the 304 stainless pipe was replaced with a 316L (low carbon) stainless section. The valve was also replaced. The new valve body is SA182-F316 stainless steel. Further studies designed to determine the magnitudes of both applied and residual stresses throughout the RWCU system are being considered.