



March 31, 2011

NG-11-0113  
10 CFR 50.73

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555-0001

Duane Arnold Energy Center  
Docket 50-331  
License No. DPR-49

Licensee Event Report #2010-004-01

Please find attached the subject report submitted in accordance with 10 CFR 50.73. This letter makes no new commitments or changes to any existing commitments.

A handwritten signature in black ink that reads "Christopher R. Costanzo". The signature is written in a cursive, flowing style.

Christopher R. Costanzo  
Vice President, Duane Arnold Energy Center  
NextEra Energy Duane Arnold, LLC

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Duane Arnold Energy Center

## 2. DOCKET NUMBER

05000331

## 3. PAGE

1 OF 3

## 4. TITLE

Linear Indication Found During Examination of Safe-End to Nozzle Welds

## 5. EVENT DATE

MONTH	DAY	YEAR
10	29	10

## 6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2010	004	1

## 7. REPORT DATE

MONTH	DAY	YEAR
03	31	11

## 8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCUMENT NUMBER
N/A	05000
FACILITY NAME	DOCUMENT NUMBER
N/A	05000

## 9. OPERATING MODE

5

## 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> VOLUNTARY LER

## 10. POWER LEVEL

0%

## 12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Robert J. Murrell, Engineering Analyst	(319) 851-7900

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO15. EXPECTED  
SUBMISSION  
DATE

MONTH	DAY	YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

Safe-end to nozzle weld RRA-F002A was scheduled in Refuel Outage (RFO) 22 as an examination under BWRVIP-75 and as a successive examination under ASME Section XI. On October 29, 2010, UT examination of the N2A reactor recirculation riser safe-end to nozzle weld, RRA-F002A, identified a circumferential flaw. The RRA-F002A circumferential weld indication was approximately 6.5" and 71% through-wall (TW), and identified as Inner Diameter (ID) surface connected. As part of the BWRVIP and ASME Section XI Inspection Programs, the inspection population was expanded to determine the extent of condition. There were three additional welds that required examination in accordance with guidance BWRVIP-75. The welds were RRG-F002A, RRF-F002A, and RRH-F002A. The UT examinations for all three welds were completed with no indications of flaws noted.

RRA-F002A was subsequently overlaid following verbal approval on November 15, 2010 of the relief request dated November 10, 2010 (ML 103160155).

The root cause identified was that the 1978 Safe-end replacements consisted of alloy 82/182 welding filler metal that is susceptible to IGSCC.

There were no Systems, Structures, or Components inoperable at the time of the event that contributed to the event.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

1. FACILITY NAME Duane Arnold Energy Center	2. DOCKET 05000 - 331	6. LER NUMBER			3. PAGE 2 OF 3
		YEAR 2010	SEQUENTIAL NUMBER 004	REV NO. 1	

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

**I. Description of Event:**

During the Duane Arnold refueling outage 22 (RFO22), ultrasonic (UT) examinations of welds susceptible to IGSCC were performed in accordance with the BWRVIP-75 and ASME Section XI inspection programs. On October 29, 2010, while in Mode 5 and shutdown for RFO22 for refueling activities, UT examination of the N2A reactor recirculation riser safe-end to nozzle weld, RRA-F002A, identified a circumferential flaw. The RRA-F002A circumferential weld indication was approximately 6.5" and 71% through-wall (TW) and identified as Inner Diameter (ID) surface connected. As part of the BWRVIP and ASME Section XI Inspection Programs, the inspection population was expanded to determine the extent of condition. There were three additional welds that required examination in accordance with guidance BWRVIP-75. The welds were RRG-F002A, RRF-F002A, and RRH-F002A. The UT examinations for all three welds were completed with no indications of flaws noted.

RRA-F002A was subsequently overlaid under an NRC verbally approved relief request.

This event was reported to the NRC as an 8 hour event under 10 CFR 50.72(b)(3)(ii)(A), Any event or condition that results in: (A) The condition of the nuclear power plant, including its principal safety barriers, as documented in Event Notification number 46379.

**II. Assessment of Safety Consequences:**

This report is being submitted pursuant to 10CFR50.73(a)(2)(ii)(A).

There was no Nuclear Safety Significance due to the indications found in the safe-end to safe-end extension weld. The location maintained the required safety factors per IWB-3640 and the flaw depth to thickness ratio was less than the maximum ASME Code requirement of 0.75. In addition, the location did not result in any violation of the pressure boundary (leak) and has been repaired under an acceptable relief request.

This event did not result in a Safety System Functional Failure.

**III. Cause of Event:**

The root cause identified was that the 1978 Safe-end Replacements consisted of Alloy 82/182 welding filler metal that is susceptible to IGSCC.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

1. FACILITY NAME Duane Arnold Energy Center	2. DOCKET 05000 - 331	6. LER NUMBER			3. PAGE 3 OF 3
		YEAR 2010	SEQUENTIAL NUMBER 004	REV NO. 1	

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

**IV. Corrective Actions:**

A modification was planned to perform repairs of the safe-end to nozzle welds. The repair was to overlay the flawed weld with material (Alloy 52) resistant to Stress Corrosion Cracking (SCC). The implementation of the overlay required a relief request from the NRC to approve the use of a non-NRC approved code case (N-504-4). The overlay was successfully applied and the ultrasonic examination results were found to be acceptable.

**V. Additional Information:**

Previous Similar Occurrences:

Previous Similar Occurrences:

1. LER 1999-006, "Indications in Recirculation Riser Nozzle-to-Safe End Welds."

In 1999, stress corrosion cracking was found in two safe-end to nozzle welds (RRB-F002 and RRD-F002). Both of these welds were overlaid using an approved relief request from the NRC.

2. LER 2007-003, "Linear indications found during UT examination of safe-end to nozzle welds."

In 2007, stress corrosion cracking was found in two safe-end to nozzle welds (RRF-F002 and RRC-F002). Both of these welds were overlaid using an approved relief request from the NRC.

EIIS System and Component Codes:

AD - Reactor Recirculation System

Reporting Requirements:

This report is being submitted under 10 CFR 50.73(a)(2)(ii)(A)

**LICENSEE EVENT REPORT (LER)**  
**CONTINUATION SHEET**

1. FACILITY NAME Duane Arnold Energy Center	2. DOCKET 05000 - 331	6. LER NUMBER			3. PAGE 4 OF 3
		YEAR 2010	SEQUENTIAL NUMBER 004	REV NO. 1	

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)