



February 27, 2012

NG-12-0045  
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 #2012-002-00

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, appearing to read "P. Wells", is positioned above the printed name.

Peter Wells  
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, NEOF-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.

<b>1. FACILITY NAME</b> Duane Arnold Energy Center	<b>2. DOCKET NUMBER</b> 05000331	<b>3. PAGE</b> 1 OF 4
---	-------------------------------------	--------------------------

**4. TITLE**  
Loss of Low Pressure Coolant Injection Safety Function due to Inoperable Instrumentation

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCUMENT NUMBER
12	29	11	2012	002	0	02	27	12	N/A	05000
									FACILITY NAME	DOCUMENT NUMBER
									N/A	05000

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)			
<b>10. POWER LEVEL</b> 100%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input 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 checked="" 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 checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> VOLUNTARY LER

**12. LICENSEE CONTACT FOR THIS LER**

NAME Robert J. Murrell, Engineering Analyst	TELEPHONE NUMBER (Include Area Code) (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
N/A	N/A	N/A	N/A	N/A					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
---	-------------------------------------	-------	-----	------

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

On December 29, 2011, at 2009, while operating at 100% power, during the performance of Surveillance Test Procedure (STP) 3.3.5.1-22, Recirculation Riser D/P A > B Instrument, three of the four recirculation riser differential pressure instruments required maintenance, and all for instruments required calibration. The four instruments support the Low Pressure Coolant Injection (LPCI) Loop Select logic by providing input that identifies and directs LPCI flow to the unbroken recirculation loop to mitigate the consequences of an accident. The conditions of the instruments found during the performance of the STP were such that reasonable assurance that the safety function of LPCI could be fulfilled during a design basis Loss of Coolant Accident (LOCA) did not exist. Reference Event Notification (EN) 47561 dated December 30, 2011.

On December 29, 2011, at 2356, all of the instruments were either repaired or re-calibrated to restore the LPCI safety function. The cause of this event was a procedural deficiency that omitted guidance for the correct setting and adjusting of instrument microswitch plunger screws. This omission led to the microswitch sticking and instrument drift.

The safety significance of this was minimized by having all other Emergency Core Cooling Systems (ECCS) operable during 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 4
		YEAR 2012	SEQUENTIAL NUMBER 002	REV NO. 0	

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

**I. Description of Event:**

On December 29, 2011, at 2009, while operating at 100% power, during the performance of Surveillance Test Procedure (STP) 3.3.5.1-22, Recirculation Riser D/P A > B Instrument, three of the four recirculation riser differential pressure microswitches required repairs, and all four required calibration. The four instruments support the Low Pressure Coolant Injection (LPCI) Loop Select logic by providing input that identifies and directs LPCI flow to the unbroken recirculation loop to mitigate the consequences of an accident. The STP is arranged to test and calibrate each instrument individually. Any calibration adjustments or repairs are completed before proceeding to the next instrument calibration. The four instruments involved are Barton Model 288 differential pressure switches.

The performance of STP 3.3.5.1-22 began on December 27, 2011. The first switch to be calibrated was PDIS 4641. The instrument microswitch was found closed and would not reset and was declared inoperable. The switch was subsequently calibrated and was declared operable on December 28, 2011.

On December 29, 2011, the STP was continued. The second switch calibrated, PDIS 4643, was also discovered with a sticking microswitch similar to the conditions found with PDIS 4641 and was declared inoperable. The instrument was returned to operable status following calibration. Calibrations then continued with PDIS 4642, which was calibrated successfully with no operability issues noted. Following calibration of PDIS 4642, testing continued on to the final instrument, PDIS 4644. PDIS 4644 was found out of calibration and was unable to be calibrated per the STP. The instrument was declared inoperable and was returned to operable status after the switch was replaced and calibrated successfully.

As a result of the conditions of the instruments found during the performance of the STP, an aggregate review of the impact of the instruments to perform their intended safety functions was performed. The review concluded that the conditions found were such that reasonable assurance that the safety function of LPCI could be fulfilled during a design basis Loss of Coolant Accident (LOCA) did not exist.

**II. Assessment of Safety Consequences:**

As a result of the conditions found with the recirculation riser instrumentation, the potential existed for LPCI Loop Select to select the incorrect recirculation loop during a LOCA. This could have resulted in LPCI injecting into the recirculation loop that contained the postulated recirculation pipe break. However, the safety significance of this was minimized by the fact that all other Emergency Core Cooling Systems (ECCS) were operable during the event. Specifically, both loops of Core Spray (CS), High Pressure Coolant Injection (LPCI), and Automatic Depressurizations System (ADS) were operable and fully capable of fulfilling their safety function for the duration of the performance of STP 3.3.5.1-22 between December 27 and December 29, 2011.

This event did result in a safety system function failure.

LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET

1. FACILITY NAME Duane Arnold Energy Center	2. DOCKET 05000 - 331	6. LER NUMBER			3. PAGE 3 OF 4
		YEAR 2012	SEQUENTIAL NUMBER 002	REV NO. 0	

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

**III. Cause of Event:**

The four Barton instruments in question experience service conditions which constantly cycle their associated microswitches due to the nature of recirculation jet pump operation. The microswitches are a subcomponent mounted on the Barton instruments. The cycling of the microswitch affects the mechanical spring and plunger assembly of the switch. These instruments cycle at a high rate; under load, this leads to contact degradation and possible sticking of the electrical contacts. Over the operating history of the switches, the frequency of replacement has been increased to ensure reliability. This creates a greater potential for miss-adjustment of the plunger screw and other internal components. Plunger screw adjustments are directed by the vendor manual during microswitch replacement, however, the adjustments are not called out in the associated maintenance procedure for the Barton instruments. The correct pre-installation of the microswitch plunger screw is important and can affect set point drift. The setting is also important, since over the life for the switch, the plunger screw will require adjustment to compensate for relaxation in the microswitch as it ages.

An apparent cause evaluation for this event determined that the microswitch plunger screws on the instruments were not adjusted as recommended by the vendor manual prior to the installation of new microswitches. This was caused by maintenance procedure deficiencies that omitted guidance for the correct setting and adjustment of the plunger screws.

**IV. Corrective Actions:**

On December 29, 2011, all maintenance activities associated with STP 3.3.5.1-22 were completed, leaving all of the instruments in an operable condition.

The following actions are planned to address the apparent cause of this event:

Maintenance procedures for the instruments will be revised to add a section for microswitch replacement which will include guidance for plunger screw adjustment.

The three instruments that were not replaced during the performance of STP 3.3.5.1-22, PDIS 4642, 4643, and 4644, will be replaced with factory set microswitch replacements.

**V. Additional Information:**

Previous Similar Occurrences:

A review of License Event Reports from the past 5 years did not identify any previous similar occurrences where an ECCS system was declared inoperable due to instrument reliability issues.

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

1. FACILITY NAME Duane Arnold Energy Center	2. DOCKET 05000 - 331	6. LER NUMBER			3. PAGE 4 OF 4
		YEAR 2012	SEQUENTIAL NUMBER 002	REV NO. 0	

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

EIIS System and Component Codes:

BO- Residual Heat Removal/Low Pressure Coolant Injection System

Reporting Requirements:

This event is being reported as an Event or Condition that Could Have Prevented Fulfillment of a Safety Function, 10CFR50.73(a)(2)(v)(B and D) and a Common-cause Inoperability of Independent Trains or Channels, 10CFR50.73(a)(2)(vii). Additionally, this event was reported under 10CFR50.72(b)(3)(v)(B), Specified System Actuation, reference Event Notification 47561.