



FPL Energy Duane Arnold, LLC
3277 DAEC Road
Palo, Iowa 52324

FPL Energy.

Duane Arnold Energy Center

January 29, 2008

NG-08-0082
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 #2007-010-00

Please find attached the subject Licensee Event Report (LER) submitted in accordance with 10 CFR 50.73. This letter makes no new commitments or changes to any existing commitments.

Richard L. Anderson
Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC

JE22

NRR

BLIND CARBON COPY LIST FOR NG-08-0082

January 29, 2008

CNRB
B. Eckes
D. Curtland
C. Dieckmann
S. Catron
ORG (S. Hamed)
INPO
Central Iowa Power Cooperative
Corn Belt Power Cooperative
GDS
DAEC-CTS Project
Licensing-LER Binder
IRMS

SUBJECT: Licensee Event Report No. 2007-010-00

File: A-120

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 05000 331	3. PAGE 1 OF 4
---	--------------------------------------	--------------------------

4. TITLE
Safety System Functional Failure of Alternate Preferred Offsite Power Source

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	DOCKET NUMBER
11	30	2007	2007	- 10 -	0	01	29	2008		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	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)							
10. POWER LEVEL 100	<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 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 checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Bob 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	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	EB	XFMR	W120	Y					

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

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

On November 30, 2007 at 1339, with the plant at 100% power, an analysis identified that at the minimum grid contingency voltage (98.8%), the Standby Transformer was not capable of providing adequate voltage to the 4160 volt essential buses under Loss Of Coolant Accident (LOCA) conditions. Based on the analysis, the Standby Transformer was declared inoperable. The Standby Transformer is the alternate preferred offsite power source. The preferred source is the Startup Transformer. The Startup Transformer was removed from service on April 10, 2006, May 18, 2006, December 13, 2006, and September 17, 2007. With both the preferred and alternate offsite power sources unavailable, a loss of safety function for offsite power occurred. This also resulted in a condition prohibited by Technical Specifications.

The primary cause for the event was attributed to latent errors in protective relay setting calculation for the Standby Transformer.

Engineering Change Package (ECP) 1846 was implemented under Modification Work Order (MWO) 1143077 to change the Standby Transformer tap setting to boost transformer secondary voltage by approximately 2.8%. The Standby Transformer was declared operable on December 14, 2007.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Duane Arnold Energy Center	05000331	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 of 4
		2007	-- 010	-- 00	

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

I. Description of Event:

Offsite power is supplied to the 161 kV and 345 kV switchyards from the transmission network by six transmission lines. The 345 kV switchyard (EISS: FK) and the 161 kV switchyard (EISS: FK) are connected via the autotransformer (T1), and both sections of the switchyard are connected to the transmission grid by at least two independent lines. From the 161 kV switchyard (the preferred power source), a single overhead transmission line feeds the Startup Transformer (EISS Code – EB) (1X3). From the Startup Transformer, dual isolated secondary windings provide feeds to the 4160 volt essential buses (EISS: EB), 1A3 and 1A4, through separate bus supply lines and circuit breakers. The Startup Transformer is sized to supply all plant power (both essential and non-essential loads) during unit startup. From the tertiary winding on the autotransformer (the alternate preferred power source), a single 34.5 kV underground line feeds the Standby Transformer (1X4). From the Standby Transformer, a single 4160 volt line feeds both essential buses through separate bus supply circuit breakers.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the essential buses. In accordance with commitments made in response to Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," both sources of offsite power would be declared inoperable if it is determined that a trip of the Duane Arnold Energy Center (DAEC) turbine generator would lead directly to voltages in the DAEC switchyard below the trip setpoints for Loss of offsite power instrumentation (92.5% essential bus voltage for 8 to 8.5 seconds).

On November 30, 2007 at 1339, with the plant at 100% power, it was identified that at the minimum grid contingency voltage (i.e. 98.8%), the Standby Transformer was not capable of providing adequate voltage to the 4160 volt essential buses under Loss of Coolant Accident (LOCA) conditions. The postulated voltage drop would result in actuation of degraded voltage relays causing the buses to automatically transfer to their respective emergency diesel generators under LOCA conditions. Analysis determined that a minimum contingency grid voltage in excess of 102.8% would be required to have prevented this transfer. This was not possible, and therefore the alternate preferred offsite power source (i.e. via the Standby Transformer) was inoperable during the time period from April 3, 2006 through December 14, 2007 and Technical Specification Limiting Condition for Operation (LCO) 3.8.1 condition A was entered. Note that the analysis performed encompassed the time period from the DAEC commitment to declare both sources of offsite power inoperable if it is determined that a trip of the DAEC turbine generator would lead directly to voltages in the DAEC switchyard below the trip setpoints for Loss of offsite power instrumentation as documented in the DAEC response to Generic Letter 2006-02, dated April 3, 2006.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Duane Arnold Energy Center	05000331	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 of 4
		2007	-- 010	-- 00	

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

The preferred power source is the Startup Transformer. A review of Operator Logs during the period the Standby Transformer was inoperable revealed that the Startup Transformer was removed from service on April 10, 2006, May 18, 2006, December 13, 2006, and September 17, 2007. This condition constituted a Safety System Functional Failure and a Condition Prohibited by Technical Specifications.

II. Assessment of Safety Consequences:

The safety significance of the calculation error that led to the Standby Transformer being declared inoperable is very low for the following reasons:

- The combined frequency of small, medium, and large LOCA events is estimated to be only one occurrence every 75 years for the DAEC.
- Since grid voltage is normally close to its rated value, the likelihood of the two essential 4160 volt buses (1A3 and 1A4) being separated from the offsite power grid after a LOCA event is low.
- Two standby diesel generators are available for providing emergency AC power to the essential buses.
- If the standby diesel generators fail to provide power to the essential buses, the offsite power sources (i.e., Startup or Standby Transformer) can be manually reconnected. The likelihood for success is judged to be high since the steps for doing so are contained in a site procedure governing loss of essential power.
- Supply of power from the Startup Transformer to the two non-essential buses (1A1 and 1A2) is not expected to be interrupted since their bus under voltage relay setpoint is much lower than that of the essential buses. As such, feedwater and condensate pumps are expected to remain operating and injecting water into the reactor vessel.

This event did result in a Safety System Functional Failure due to both the preferred and alternate preferred offsite power sources being unavailable at the same time.

III. Cause of Event:

The apparent cause of the Standby Transformer being declared inoperable could not be clearly established due to the latency of the various errors. Errors were found in calculations dating back to 1990 and before and the inputs to these calculations could not be revalidated.

IV. Corrective Actions:

1. A modification was implemented to change the tap setting of the Standby Transformer to boost its output voltage by approximately 2.8%.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Duane Arnold Energy Center	05000331	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 of 4
		2007	-- 010	-- 00	

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

2. The nominal setpoint of the essential bus degraded voltage relays was reduced from 92.5% to 91.6%. This resulted in the relay reset being reduced from 95.5% to 94.4%.
3. The American Transmission Company (ATC) Minimum Contingency Switchyard voltage alarm setpoint has been increased from 98.8% to 99.2%.
4. Plant operating procedures have been revised to limit the operation of Residual Heat Removal (RHR) and Residual Heat Removal Service Water (RHRSW) pumps such that only 6 of 8 pumps can be operated at any time. This has reduced the post LOCA essential bus loading by ~ 1 MWe.

The Standby Transformer was declared operable on December 14, 2007.

V. Additional Information:

Previous Similar Occurrences:

A review of LERs over the previous 5 years revealed no similar occurrences

EIIS System and Component Codes:

EB – Low Voltage Power System – Class 1E
FK – Switchyard System

Reporting Requirements:

This event is reportable under 10 CFR 50.72(b)(3)(v), 'Any event or condition that alone at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to (D) Mitigate the consequences of an accident.'