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FPL Energy.

Duane Arnold Energy Center

January 29, 2008

NG-08-0081
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 #2007-011-00

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

JEJ
NCR

BLIND CARBON COPY LIST FOR NG-08-0081

January 29, 2008

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Corn Belt Power Cooperative
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DAEC-CTS Project
Licensing-LER Binder
IRMS

SUBJECT: Licensee Event Report No. 2007-011-00

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
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4. TITLE
Undervoltage Condition Resulted in the Actuation of the Emergency Diesel Generators

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
12	01	2007	2007	- 11 -	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 checked="" 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)	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
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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

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

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

On December 1, 2007 at 1435, while operating at 100% power with the Standby Transformer inoperable, a fault developed on the 161 KV electrical transmission line to the Fairfax substation causing Duane Arnold Energy Center (DAEC) switchyard voltage to dip to approximately 62%. Switchyard Circuit Breakers (CB) 3110 and CB 8090 opened to clear the fault in approximately 3 cycles. At that time, the essential buses (1A3 and 1A4) were supplied from the Startup Transformer (1X003). Since the Startup Transformer is supplied directly from the switchyard, the essential buses experienced a voltage drop similar to the switchyard voltage and dropped approximately 62% for 3 cycles, resulting in the sequencing under-voltage relays sending a start signal to the Emergency Diesel Generators (EDGs). Neither EDG connected to its respective bus and loaded.

The electrical transmission line fault was caused by ice and high winds. The 'A' EDG was secured at 1507 on December 1, 2007. The 'B' EDG was secured at 1514 on December 1, 2007.

On December 1, 2007 at 1825, an eight-hour non-emergency report was made pursuant to 10 CFR 50.72 (ENS Number 43817).

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	-- 011	-- 00	

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

I. Description of Event:

On December 1, 2007 at 1435, while operating at 100% power with the Standby Transformer (EIS: EB) inoperable due to latent design issues, a fault developed on the 161 KV electrical transmission line (EIS: FK) to the Fairfax substation causing Duane Arnold Energy Center (DAEC) switchyard voltage to dip to approximately 62%. Switchyard Circuit Breakers (CB) 3110 and CB 8090 opened to clear the fault in approximately 3 cycles. At that time, the essential buses (1A3 and 1A4) (EIS: EB) were supplied from the Startup Transformer (1X003) (EIS: EB). Since the Startup Transformer is supplied directly from the switchyard, the essential buses experienced a voltage drop similar to the switchyard voltage and dropped approximately 62% for 3 cycles, resulting in the sequential loading relays sending a start signal to the Emergency Diesel Generators (EDGs) (EIS: EK). The sequential loading relays have a safety function of initiating sequential loading of the Core Spray and Residual Heat Removal pumps onto essential busses following a Loss of Offsite Power/Loss of Coolant Accident (LOOP/LOCA). Their secondary function, which is not a safety function, is to send a start signal to the EDGs on degraded voltage. These relays are considered backups since start signals to the EDGs are also provided by Startup and Standby Transformer under voltage and bus degraded voltage relays. It should be noted that their secondary function only requires an under voltage condition to exist for ≤ 4 cycles to generate an EDG start signal.

Neither EDG connected to its respective bus and loaded.

Cause of the fault

The fault was caused by ice and high winds.

Analysis of EDG Actuation

The voltage transient caused both EDGs to start but not load onto their respective buses, 1A3 and 1A4. The supply breakers from the Startup Transformer (1A302 and 1A402) remained closed and bus voltage recovered within 3 cycles of dipping to approximately 62%.

The system is designed such that any one of the following three signals can automatically start the EDG:

- Loss of Coolant Accident (LOCA) signals of 2 psig high drywell pressure or 64.0" reactor vessel low-low-low level,
- Loss of Offsite Power (LOOP) signals of <65% of rated voltage on the secondary windings of both the Startup and Standby Transformers or degraded essential bus voltage of <92.5% of rated voltage for 8-8.5 seconds.
- Essential bus under-voltage signal of <65% of rated bus voltage.

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

Since bus voltage dropped below 65% of rated, the EDG started per their design.

Analysis of EDGs Not Connecting to Their Respective Buses

The EDG output breaker is designed to close automatically when the EDG receives an automatic start signal and the following conditions are met:

- The engine is up to 90% of rated speed (810 rpm).
- Essential bus supply breakers from the Startup and Standby Transformers are open (1A301, 1A401, 1A302 and 1A402).
- Under-voltage (<20%) condition exists on the bus.
- Time delay relay 102-311, set at 15 cycles, has energized (starts timing when the 20% under-voltage condition exists and both input breakers from the supply transformers are open).
- EDG output is at 90% of rated voltage.

Since the supply breakers from the startup transformer 1A302 and 1A402 never opened coincident with the bus voltage never dropping below 20%, the EDGs did not load. Therefore the EDGs operated per their design during this event.

II. Assessment of Safety Consequences:

The automatic starting of the EDGs in response to a short-duration under-voltage condition had no personnel or radiological safety significance. Since the EDGs were capable of fulfilling their safety function throughout the event and the Startup Transformer was powering buses 1A3 and 1A4, there is no nuclear safety significance.

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

III. Cause of Event:

The apparent cause for DAEC being susceptible to EDG auto starts due to electrical transmission line faults is that the sequential loading relays operate simultaneously with the switchyard protective relaying. Therefore, any fault affecting the local grid has the potential to start the EDGs.

IV. Corrective Actions:

The 'A' EDG was secured at 1507 on December 1, 2007. The 'B' EDG was secured at 1514 on December 1, 2007.

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Actions have been initiated to assess the benefit of a modification to slow down the sequential loading relay logic to prevent spurious starts of the EDGs due to momentary grid disturbances.

V. Additional Information:

Previous Similar Occurrences:

A review of LERs over the previous 5 years revealed the following similar occurrence:

- LER 2007-004, "Severe Weather Causes Grid Disturbance Resulting In Loss of Shutdown Cooling."

EIIS System and Component Codes:

- EK – Emergency Onsite Power System
- EB – Low Voltage Power System – Class 1E
- FK – Switchyard System

Reporting Requirements:

This event was reported under 10CFR50.72(b)(3)(iv)(A), 'Any event or condition that results in valid actuation of any of the systems listed in paragraph (b)(3)(iv)(B) of this section' due to the Auto Start of the 'A' and 'B' Standby Diesel Generators. Reference EN # 43817.