



**FPL Energy**  
**Seabrook Station**

FPL Energy Seabrook Station  
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**AUG 31 2005**

Docket No. 50-443  
SBK-L-05171

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

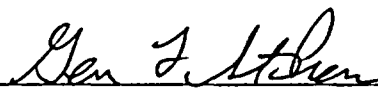
Seabrook Station  
Licensee Event Report (LER) 2005-007-00 for  
Noncompliance with the Technical Specifications Due to Circuit Card Failure

Enclosed is Licensee Event Report (LER) 2005-007-00. This LER reports an event that occurred at Seabrook Station on July 7, 2005. This event is being reported pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D).

Should you require further information regarding this matter, please contact Mr. James M. Peschel, Regulatory Programs Manager (603) 773-7194.

Very truly yours,

FPL ENERGY SEABROOK, LLC

  
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Gene F. St. Pierre  
Site Vice President

cc: S. J. Collins, NRC Region I Administrator  
V. Nerses, NRC Project Manager, Project Directorate I-2  
G. T. Dentel, NRC Senior Resident Inspector

*JE22*

**ENCLOSURE TO SBK-L-05171**

## 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: 50 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 [infocollect@nrc.gov](mailto:infocollect@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 Seabrook Station	2. DOCKET NUMBER 05000 443	3. PAGE 1 OF 4
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4. TITLE  
Noncompliance with the Technical Specifications Due to Circuit Card Failure

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
07	07	2005	2005	- 007 -	00	08	31	2005	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	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 checked="" 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 James M. Peschel, Regulatory Programs Manager	TELEPHONE NUMBER (Include Area Code) 603-773-7194
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## 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
X	EB	XC	V124	N					

## 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)

On July 7, 2005 while at 100% power, Seabrook Station discovered that a condition prohibited by the Technical Specifications (TS) had existed. On June 20, 2005 the train-B containment building spray (CBS) pump failed to start during a post-maintenance retest using a slave relay test to start the pump. Subsequent troubleshooting determined that the cause of the pump's failure to start was a failed relay driver card in the train-B emergency power sequencer (EPS). The card failure prevented the CBS pump from automatically starting on an engineered safety features actuation signal and also rendered the train-B emergency diesel generator (EDG) inoperable. Further review determined that this condition existed for approximately 57 days, beginning on April 24, and exceeded the 72-hour allowed outage times of TS 3.6.2.1 and TS 3.8.1.1 for the CBS pump and EDG, respectively. While EDG-B and CBS pump-B were inoperable, the redundant EDG and CBS were rendered inoperable during this period to perform surveillance testing. The unplanned, concurrent inoperability of both EDGs and CBS pumps resulted in a condition that could have prevented the fulfillment of the safety functions of these systems. The cause of the card failure was a random, premature failure of the card. The corrective action consisted of replacing the failed circuit card. No adverse consequences resulted from this event.

## LICENSEE EVENT REPORT (LER)

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Seabrook Station	0500-0443	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2005	- 007	- 00	

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

I. Description of Event

On July 7, 2005 during operation in mode 1 at 100% power, Seabrook Station determined that the train-B containment building spray (CBS) pump [BE, P] and the train-B emergency diesel generator (EDG)[EK, DG] were inoperable for a period that exceeded the individual Technical Specification (TS) allowed outage times. This is a condition prohibited by the Technical Specifications. The train-B containment building spray pump was removed from service at 0651 on June 20, 2005 for planned maintenance. The post-maintenance retest required operating the pump, and a slave relay test was scheduled to initiate starting of the pump. Upon initiation of the slave relay test, CBS pump-B failed to start. Subsequent troubleshooting determined that the cause of the pump's failure to start was a failed relay driver card in the train-B emergency power sequencer (EPS) [EB, XC]. The failed card prevented CBS pump-B from automatically starting on an engineered safety features actuation signal and rendered CBS pump-B and the train-B emergency diesel generator inoperable. Following replacement of the EPS relay driver card, the CBS pump and EDG were returned to operable status at approximately 0422 on June 21, 2005.

Further review determined that the EPS relay driver card had failed approximately 57 days earlier, beginning at about 2300 on April 24, 2005. As a result, the CBS pump and EDG were inoperable for a period greater than the 72-hour allowed outage times of TS 3.6.2.1 and TS 3.8.1.1 for the CBS pump and EDG, respectively. While the EPS card failure rendered EDG-B inoperable from April 24 to June 20, EDG-A was also inoperable with its circuit breaker racked to the test position to support surveillance testing on May 10, 2005 from 1947 to 2018. The unplanned, concurrent inoperability of both EDGs resulted in a condition that could have prevented the fulfillment of the safety function of the onsite emergency power system. Similarly, CBS pump-A was inoperable for surveillance testing on three occasions in May 2005 for a total time of approximately four hours while CBS pump-B was inoperable due to the failed EPS card.

II. Cause of Event

The cause of the failure was a random, premature failure of a printed circuit card in the train-B EPS. The card was installed on April 24, 2005 and failed after approximately 19 hours of operation. The relay driver card failure initiated an input to the main plant computer logger function on April 24, 2005. The logger notification, however, was not identified as a failure of the EPS.

III. Analysis of Event

The two emergency power sequencers, one associated with each emergency bus, are solid state devices that function to start and control the loading of the EDGs in the event of an under-voltage condition on the station emergency buses. Each sequencer contains a number of printed circuit boards that perform logic and timing functions. In the event of a loss of offsite power and following automatic closing of the diesel generator circuit breaker [EK, 52], loads are connected to the emergency buses [EB, BU] in a predetermined sequence dictated by plant conditions.

(1-2001)

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The EPS circuit failure would have prevented the automatic starting of CBS pump-B at 27 seconds (step 3) in the EPS sequence during a loss of offsite power coincident with a CBS actuation signal. However, the EPS would have provided a start signal for the CBS pump at 52 seconds (step 8) in the sequence. Nonetheless, the EPS circuit failure rendered the train B EPS inoperable because of its inability to start the CBS pump at step 3, as assumed when a CBS actuation signal is present within 27 seconds of an accident. The EPS remained capable of sequencing other loads on the emergency bus. An operable EPS is required to maintain operability of its associated EDG. As a result, this condition rendered EDG-B inoperable for approximately 57 days, exceeding the 72-hour allowed outage time of TS 3.8.1.1, AC Sources – Operating.

With DG-B inoperable as a result of the undetected EPS card failure, DG-A was rendered inoperable on May 10, 2005 from 1947 until 2018. During this 30-minute period, the circuit breaker for DG-A was in the test position to support surveillance testing. A risk review determined that this condition (two inoperable DGs) was of minimal risk significance, having no impact on core damage frequency or large early release frequency.

The CBS system is designed to remove the energy discharged to the containment following a loss-of-coolant accident (LOCA) or main steam line break (MSLB) to prevent containment pressure from exceeding design pressure and to reduce and maintain containment temperature and pressure within acceptable limits. Operation of the CBS system is initiated automatically upon receipt of a containment spray actuation signal when containment pressure reaches 18 psig.

The faulty circuit board in the EPS affected the ability of CBS pump-B to automatically start on a CBS actuation signal. The affected circuit in the EPS, which is normally de-energized, remained continuously energized and caused a normally closed contact (SR3) in the starting circuit for CBS pump-B to remain open. As a result, the EPS failure prevented the CBS pump from starting on a CBS actuation signal via slave relay K644B [JE, RLY] in the absence of a loss of offsite power. Also, the open contact would have prevented the CBS pump from starting at step 3 in the EPS sequence during a loss of offsite power coincident with a CBS actuation signal; however, the pump would have automatically started at step 8 for this condition. The EPS failure had no impact on the ability to manually operate the CBS pump. This event rendered the CBS pump inoperable for approximately 57 days and exceeded the 72-hour allowed outage time permitted by the TS 3.6.2.1, Containment Spray System.

Concurrent with the unrecognized inoperability of CBS pump-B, surveillance testing, which disabled automatic starting of the pump by placing its control switch in pull-to-lock, rendered CBS pump-A inoperable on three occasions in May 2005. CBS pump-A was inoperable for approximately three hours on May 8 and for 30 minutes and 47 minutes on May 9 and 12, respectively. The inoperability of both CBS pumps was of minimal risk significance, having no impact on core damage frequency or large early release frequency.

This event is of regulatory significance because it met the reporting criteria of 10 CFR 50.73 (a)(2)(i)(B) for a condition prohibited by the TS and 10 CFR 50.73 (a)(2)(v)(D) for an event that could have prevented fulfillment of a safety function needed to mitigate the consequences on an accident. The event was reported to the NRC on July 7, 2005 at 1251 (event # 41824) in accordance with the Facility Operating License Condition 2.G for a violation of the TS.

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This event had no adverse impact on the plant or on the health and safety of the public. No plant transients, systems actuations, or consequences resulted from this event. This event did involve a Safety System Functional Failure because the onsite emergency power system (both EDGs), a safety function that is separate from offsite power, was unavailable for approximately 31 minutes on May 10, 2005. Also, both CBS spray pumps were inoperable for approximately four hours during the event. Nonetheless, a risk review determined that this event was of minimal risk significance, having no impact on core damage frequency or large early release frequency. EDG-B remained capable of sequencing loads, other than CBS pump-B, on the emergency bus as designed. CBS pump-B remained functional for containment performance considerations since it would start at 52 seconds. Further, the emergency operating procedures contain sufficient guidance that directs the operators to manually start the CBS pumps as required. This is not a time critical step since Seabrook Station containment pressure capacity is in excess of 165 psig. No other inoperable structures, systems, or components contributed to the event.

IV. Corrective Actions

The corrective actions taken for this event included replacing the failed circuit card in the train-B EPS and implementing a daily EPS monitoring plan. To allow prompt identification of an EPS failure, the EPS monitoring plan has the operators verify proper EPS light indications and alarm status on a daily frequency.

A review of the failure concluded that the extent of condition was limited to only the train-B EPS. An inspection of the train-A EPS found no abnormal indications. Further, no new circuit cards had recently been installed in the train-A EPS; therefore, it was not susceptible to experiencing a similar premature failure of a circuit card.

V. Additional Information

The Energy Industry Identification System (EIIIS) codes are included in this LER in the following format: [EIIIS system identifier, EIIIS component identifier].

Similar Events

Seabrook Station has experienced no other confirmed relay driver circuit board failures in the last five years.

Manufacturer Data

The emergency power sequencers used at Seabrook Station were manufactured by Vitro Laboratories, a division of Automation Industries, Inc. The card that failed is Vitro part number 0423-2797-2.