



JAN 16 2008

LR-N08-005

10CFR50.73

United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-001

Hope Creek Generating Station Unit 1  
Facility Operating License No. NPF-57  
Docket No. 50-354

Subject: Licensee Event Report 2007-002-001

In accordance with 10 CFR 50.73(a)(2)(iv)(A) and 10 CFR 50.72 (b)(2)(iv)(A), PSEG Nuclear LLC, is submitting Licensee Event Report Number 2007-002-001, Docket No. 50-354. This is an update to the original LER 2007-002-00.

Should you have any questions concerning this letter, please contact Mr. Philip J. Duca at (856) 339-1640.

No Regulatory commitments are contained in the LER.

Sincerely,

A handwritten signature in black ink that reads "John F. Perry". The signature is written in a cursive style with a large, sweeping "P" at the end.

John F. Perry  
Plant Manager  
Hope Creek Generating Station

Attachment: Licensee Event Report

JE22  
NRR

cc: Mr. S. Collins, Administrator - Region 1  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. R. Ennis, Licensing Project Manager - Hope Creek  
U.S. Nuclear Regulatory Commission  
Mail Stop 08B3  
Washington, DC 20555-0001

USNRC Resident Inspector office - Hope Creek (X24)

Mr. P. Mulligan, Manager IV  
Bureau of Nuclear Engineering  
PO Box 415  
Trenton, New Jersey 08625

# 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.

<b>1. FACILITY NAME</b> Hope Creek Generating Station	<b>2. DOCKET NUMBER</b> 05000 354	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
 Performance of Vital Bus Surveillance Caused a Partial Loss of Feed Resulting in a Manual Reactor Scram

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
05	29	2007	2007	- 002 -	001	01	16	2008	N/A	
									FACILITY NAME	DOCKET NUMBER
									N/A	

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> <i>(Check all that apply)</i> <table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input checked="" type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right; font-size: small;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>	<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 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 checked="" 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
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<b>10. POWER LEVEL</b>  100																																					

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Philip J. Duca, Compliance Engineer	TELEPHONE NUMBER (Include Area Code) 856-339-1640
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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

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" 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 May 29, 2007 while operating with the reactor at 100% power and the main generator synchronized to the grid, a manual scram was initiated in anticipation of a low reactor water level condition.

An unexpected slow (dead bus) transfer of a 4 KV Class 1-E bus from the normal to alternate source occurred during monthly relay testing. The slow (dead bus) transfer and subsequent loss of a non-safety related motor control center (MCC) resulted in a loss of feed water followed by a reactor scram. A personnel error initiated the slow bus transfer and a low margin condition associated with the reactor feed pump oil system design caused a loss of 2 reactor feed pumps. As a result of these conditions reactor level could not be maintained and operators took the action to manually scram the reactor. After the scram, reactor water level lowered to Level 2 and a valid ECCS initiation signal caused HPCI and RCIC to start and inject to the core. The ECCS injection required a 4-hour report that was transmitted to the NRC in accordance with 10 CFR 50.72 (b)(2)(iv)(A).

Corrective actions included revising the surveillance procedure to require testing only be performed on an open breaker and to verify that the relay contacts are in the correct state upon completion of the surveillance. Operating procedures were revised to maintain both Reactor Feedwater Pump (RFP) Lube Oil pumps operating for each RFP.

CONTINUATION SHEET

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**NARRATIVE**

**PLANT AND SYSTEM IDENTIFICATION**

General Electric – Boiling Water Reactor (BWR/4)  
Emergency Onsite Power Supply System – {EK}  
Feedwater System – {SJ}

\*Energy Industry Identification System {EIIIS} codes and component function identifier codes appear as {SS/CCC}

**IDENTIFICATION OF OCCURRENCE**

Event Date/Time: May 29, 2007 - 08:34  
Discovery Date/Time: May 29, 2007 - 08:34

**CONDITIONS PRIOR TO OCCURRENCE**

Hope Creek was in Operational Condition 1 with reactor power at 100%. No structures, systems, or components were inoperable that contributed to the event.

**DESCRIPTION OF OCCURRENCE**

On Tuesday May 29, 2007, relay technicians were assigned to perform a feeder degraded voltage monthly instrumentation channel functional test on the 4kV 'A' channel (10A401 bus) breaker 52-40108. Permission was received from the control room to begin the surveillance on channel 1(A-B) on this breaker. This time was documented in the Technical Specification (TS) surveillance logs as 0823. It was understood that there was only one hour available for the channel 1(A-B) and one hour available for channel 2(B-C), which is typical for short duration LCO surveillances. The procedure states that the test should be completed in as little time as possible.

Test switches 8 and 9 (normal AC power to the relay) on relay 27 channel 1(A-B) were opened and a variable AC power supply was connected to the relay for testing purposes. A calibration test was performed on the relay by recording the drop out and pick up voltages. These voltages were satisfactory because the relay responded within its technical specification and administrative criteria.

The next step was to test the feeder degraded voltage relays and timing checks. A timer stop module (a device used to time relay actuation) was connected to the timer stop test switch jaws for channel 1(A-B). The variable AC supply was dropped instantaneously to 109VAC and the time that it took for the relay to actuate was recorded. The time was within acceptance criteria and no adjustments were needed. The variable AC power supply was disconnected from relay 27(A-B), and test switches 8 and 9 were closed to restore normal AC power to the relay. The relay de-energized and closed and was verified to be in the closed state. It was also verified that no alarms associated with the bus were locked in. Channel 1(A-B) was signed out of the surveillance logs and channel 2(B-C) was signed in at 0831, 8 minutes after channel 1(A-B) was started.

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**NARRATIVE**

Channel 2(B-C) began similarly to channel 1(A-B). The calibration test was performed by recording the drop out and pick up voltages of relay 27(B-C). These voltages were then compared to the TS acceptance criteria, as well as the administrative criteria in the procedure. No adjustments were needed.

Approximately 19 seconds after dialing down the drop out voltages and prior to commencing the test for the feeder degraded voltage relays and timing checks, the 52-40108 breaker opened at 08:34:47 and a slow transfer signal of loads to the alternate feeder breaker (52-40101) was initiated. Voltage was restored to the bus through the 52-40101 breaker. This slow transfer allowed enough time for the bus 70% under voltage relays to drop out and initiate the 'A' channel Loss of Offsite Power (LOP) sequencer leading to a shedding of the non-1E MCC.

The loss of the MCC caused the operating oil pumps for the A and B Reactor Feed Pump (RFP) turbines to lose power. The standby oil pumps for both of the in service A and B RFPs started. The standby oil pumps did not restore the Control/Lube Oil pressure fast enough and the oil pressure degraded to the Low-Low Lube Oil trip set point, resulting in the loss of two out of the three RFPs.

At 08:35:03, the Hope Creek reactor was manually tripped offline anticipating reaching the low-level scram set point.

**CAUSE OF OCCURRENCE**

The root cause of the unexpected bus transfer could not be conclusively determined by the initial investigation. Two potential causes to the initiating event were addressed. The timer stop timing module test leads may have been left in place from a previous procedure step creating a low impedance path to satisfy the logic path. It was noted that if the test leads had not been properly removed in the correct sequence, then the unexpected slow (dead bus) transfer would occur. The maintenance personnel performing the surveillance stated that they believed they followed the procedure correctly. The investigation concluded from simulated testing of the conditions that the actual alarm chronology contradicted personnel statements. This potential human performance failure was the most likely root cause.

A stuck channel 1(A-B) 27X 7-8 contact along with the HFA channel 2(B-C) 27X HFA relay being tested would satisfy the logic to cause a slow transfer. The root cause for this problem could not be verified without a vital bus outage, which was scheduled during the next refueling outage. Multiple tests were performed to ensure operability. The relay physically appeared to be working properly post event. The surveillance was re-performed satisfactorily. During the next surveillance test on July 3<sup>rd</sup>, the relay was observed while it was opened and closed with no obvious deficiencies identified.

The initially suspected potential relay malfunction has been discounted. Collected data has proven that leaving the test equipment connected contrary to procedure guidance will cause a bus swap to occur. The HFA relay in question was removed during the Oct-Nov 2007 refueling outage and sent to a laboratory for analysis. The analysis of the as found condition of the relay demonstrated that the relay did not contribute to the bus transfer. The cause of the relay event was due to a human performance error.

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**NARRATIVE**

**PREVIOUS OCCURRENCES**

A review of previous reportable events at Hope Creek was performed to determine if a similar event had occurred.

09/19/03 – Hope Creek, LER 2003-007-00 Reactor Scram Due To Electrical Transient, Low Reactor Water Level And Loss Of Reactor Feed Pumps A and C. Corrective actions from this event were not completed in a timely manner and could have prevented the partial loss of feedwater during this 2007 event.

**SAFETY CONSEQUENCES**

The safety impact is minimal due to all plant systems operating as designed.

The momentary loss of the non-1E 10A401 bus is bounded by the loss of AC power event and does not impact reactor safety.

The loss of power to the 10A401 bus normally would not impact electrical power generation. However, under the current design, the reactor feed pump lube oil system cannot withstand the loss of the only operating lube oil pump. Such a loss will cause a RFP trip.

The loss of all feed water flow (USAR section 15.9.6.3.3.I event 20) bounds the loss of two RFPs and does not impact reactor safety.

A review of this event determined that a Safety System Functional Failure (SSFF) has not occurred as defined in Nuclear Energy Institute (NEI) 99-02.

**CORRECTIVE ACTIONS**

Surveillance procedure has been revised to require testing on an open breaker and to verify that contact 7-8 is open at the conclusion of each section of the procedure and to create verification for the step that removes the test equipment.

The RFP lube oil system will be operated with two lube oil pumps in operation for each RFP until a permanent fix can be implemented.

**COMMITMENTS**

This LER contains no commitments.